U.S. GOVERNMENT

RESEARCH & DEVELOPMENT REPORTS

April 5, 1965

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Abstract Journal

for

Science and

Industry

CLEARINGHOUSE
FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
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RESEARCH AND DEVELOPMENT REPORTS

Issued twice a month by the Clearinghouse for Federal Scientific and Technical Information (formerly Office of Technical Services). Annual subscription $15 ($3.75 additional for foreign mailing). Single copy $1. Make remittance payable to Superintendent of Documents and mail either to a U.S. Department of Commerce Field Office or to Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. Address changes should be sent to Superintendent of Documents.

PURPOSE

U.S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS (formerly U.S. Government Research Reports) is published by the Clearinghouse for Federal Scientific and Technical Information to announce the availability to the public of new reports of U.S. Government-sponsored research and development released by the Department of Defense and other Federal agencies. The Atomic Energy Commission and the National Aeronautics and Space Administration issue their own announcement journals as noted below.

FORMAT

USGRDR contains two sections with a combined table of contents. The first section, "Technical Abstract Bulletin" (TAB), announces reports released by the Defense Documentation Center (DDC) of the Department of Defense. The second section, "Other Research Reports and Related Material," announces reports released by civilian agencies and also includes certain older military reports. Reports are listed by accession/report number under 33 subject division headings. Both sections contain abstracts and complete bibliographic citations and are followed by their respective indexes. Reports of current high industrial interest are featured in **"Research Highlights."**

HOW TO USE

Readers are urged to review all abstracts in their fields of interest, noting accession/report numbers and titles of reports to be ordered. Although primarily for retrieval, the descriptors provide a quick grasp of a report's scope. The reader is reminded that reports applicable to his field may be found under various subject divisions; the various indexes will aid in locating those reports. Cumulative indexes are published periodically.

TO ORDER REPORTS

Order reports by accession/report number (as given on the first line of each entry) and title from the Clearinghouse, U.S. Department of Commerce, Springfield, Va. 22151, or from any Commerce Field Office (listed on inside back cover). Prices for hard copy (HC) and microfiche copy (MF) are given for each entry. Prepayment is required unless purchases are to be charged to Superintendent of Documents deposit account. Order forms will be found in the back. Make check or money order payable to National Bureau of Standards—CFSTI.

OTHER JOURNALS

Reports of the National Aeronautics and Space Administration and the Atomic Energy Commission can be ordered from the Clearinghouse. Reports available are listed in the following journals open to public subscription from Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

NUCLEAR SCIENCE ABSTRACTS, Atomic Energy Commission, $30 a year domestic, $37 foreign, $1.75 single copy plus 25 percent foreign mailing.

SCIENTIFIC AND TECHNICAL AEROSPACE REPORTS. National Aeronautics and Space Administration, $25 a year domestic, $31 foreign, $1.50 single copy plus 25 cents foreign mailing.

U.S. DEPARTMENT OF COMMERCE
John T. Connor, Secretary

CLEARINGHOUSE FOR FEDERAL SCIENTIFIC AND TECHNICAL INFORMATION
Springfield, Va. 22151
Bernard M. Fry, Director

Contents may be printed freely. Mention of source will be appreciated.
Use of funds for this publication approved by the Director of the Bureau of Budget, June 30, 1961.

U.S. DEPARTMENT OF COMMERCE
NATIONAL BUREAU OF STANDARDS
INSTITUTE FOR APPLIED TECHNOLOGY

CLEARINGHOUSE FOR FEDERAL
SCIENTIFIC AND TECHNICAL INFORMATION
SPRINGFIELD, VIRGINIA 22151

Dear Subscriber:

USGRDR is wearing a new cover--one of a new family of covers that will help to distinguish the principal Clearinghouse publications.

This imposes upon the publications a unity of design that is in keeping with their unity of purpose. It is a change not merely in wrapping but a sign of the changes in content.

In that sense the new family of covers marks for the Clearinghouse a number of important strides taken during the past year in becoming the central source for information on Government-sponsored research and development in the physical sciences and engineering.

USGRDR has seen a number of changes during the past year, including an addition to its name. New forms of technical material have been announced in an effort to make USGRDR a comprehensive catalog of Government-sponsored research.

"Research Highlights" in these newly added blue pages represents an increasing effort to select out of the wealth of material collected by the Clearinghouse the reports that should prove of most practical value to the industrial community.

Another major effort at the kind of unity symbolized by the new family of covers is the latest Clearinghouse publication, the Government-Wide Index to Federal Research and Development Reports, a comprehensive, unified index to Government R. and D. reports listed in USGRDR and the announcement journals of 3 major research agencies, NASA, AEC and the Department of Defense.

To impose even greater unity and selectivity on the vast amount of technical material available, the Clearinghouse plans more rapid and expanded reference and reproduction services by the increased use of the most modern computer and reproduction equipment. In the next few weeks we should achieve our programmed schedule on deliveries: 24-hour service on documents in print, 4 days maximum when reproduction is required.

Be assured that the Clearinghouse staff is making every effort to provide the most rapid, efficient service possible. Your suggestions and comments are always welcome.

Sincerely yours,

Bernard M. Fry

Bernard M. Fry
Director

special ANNOUNCEMENTS

A SINGLE INDEX FOR NEW FEDERAL R& D REPORTS

A Clearinghouse publication beginning in April 1965 provides scientists, engineers librarians and management with a single index to new unclassified Government-sponsored technical reports.

Entitled Government-Wide Index to Federal Research and Development Reports, it will be made up from machinable index records prepared by the Atomic Energy Commission, National Aeronautics and Space Administration, Department of Defense, and the Clearinghouse.

Government-sponsored research reports included in the following agency announcement journals will be indexed in the new publication:

Nuclear Science Abstracts (AEC)

Scientific and Technical Aerospace Reports (NASA)

Technical Abstract Bulletin (Defense Documentation Center)

U.S. Government Research and Development Reports (Clearinghouse)

Appearing the 15th of each month, the Government-Wide Index will list the reports announced during the previous month.

For this project, the Clearinghouse is initially using the computer facilities of the Aerospace Research Applications Center at the University of Indiana. The journal records, in the form of punched paper tapes, magnetic tapes, and cards, are fed into the computer which merges them into a single index under the four standard access points of subject, author, source and report number.

How to Order

The Government-Wide Index to Federal Research and Development Reports will be printed and sold by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C., 20402. Price is $10 for a one-year subscription (12 issues); add $2.50 for foreign mailing; single issue, $1.25. Make remittance payable to Superintendent of Documents.

RELIABILITY ABSTRACTS OFFERED ON SUBSCRIPTION

The Clearinghouse for Federal Scientific and Technical Information is selling subscriptions to the National Aeronautics and Space Administration monthly publication, Reliability Abstracts and Technical Reviews. The publication rapidly abstracts and rigorously analyzes material in the current literature on reliability. Begun by NASA in April 1961, it alerts engineers and scientists to the latest developments in the theory and practice of reliability, especially as they apply to space technology.

The development of the general field of reliability began about 30 years ago as a sort of statistical quality-control technique for mass-produced commodities. What is new in reliability is the intensive application of its concepts and procedures, notably to space equipment, which must not only be built to operate in a hostile and sometimes undefined environment, but also without the experience available from mass-production statistics. Most spacecraft and propulsion systems are few-of-a-kind.

Under contract to NASA, a team of scientists and statisticians at the Research Triangle Institute, Durham, N. C., surveys current papers on reliability and closely related subjects from all available sources. Each month they search five or six dozen journals, reports, and proceedings of conferences and transactions.

The significant feature of the abstracting is to subject the contents of the original source document to searching critical analysis, something rarely encountered in abstracting services.

Reliability Abstracts subscriptions are on a calendar year basis beginning in January. Subscribers who order later in the year will receive back issues from January. An annual index is included in the subscription price.

The abstracts cost $15 per year starting with January 1965. The 1965 abstracts will be identified as Volume V and will be distributed monthly.

Back volumes are also available at $15 each. They are:

Volume I, April 1961 - May 1962
Volume II, June 1962 - May 1963
Volume III, June 1963 - May 1964
Volume IV, June 1964 - December 1964

Orders are being accepted now. Order from The Clearinghouse, U. S. Department of Commerce, Springfield, Va. 22151.

PRICE CITATION CHANGE

Prices in USGRDR were formerly cited as "OTS Prices." Beginning with this issue they will be cited as "CFSTI Prices," initials of the Clearinghouse for Federal Scientific and Technical Information.

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FEDERAL REGIONAL TECHNICAL REPORT CENTERS

Each of the Federal Regional Technical Report Centers listed below contains a collection of USAEC, NASA, and DOD unclassified reports as well as reports of other U. S. Government agencies and provides reference, interlibrary loan, and reproduction services.

Carnegie Library of Pittsburgh
4400 Forbes St.
Pittsburgh, Pa. 15213

Columbia University
Engineering Library
Seeley W. Mudd Building
New York, N. Y. 10027

Georgia Institute of Technology
Price Gilbert Library
Atlanta, Ga. 30300

The John Crerar Library
35 West 33rd St.
Chicago, Ill. 60616

Library of Congress
Science and Technology Division
Washington, D. C. 20540

Linda Hall Library
5109 Cherry Street
Kansas City, Mo. 64100

Massachusetts Institute of Technology
M. I. T. Libraries
Cambridge, Mass. 02139

Southern Methodist University
Science Library
P. O. Box 1339
Dallas, Tex. 75222

University of California
General Library
Berkeley, Calif. 94704

University of Colorado
Boulder, Colo. 80301

University of Washington Library
Government Documents Center
Seattle, Wash. 98105

CUMULATIVE INDEXES

The following Cumulative Indexes for U. S. Government Research and Development Reports (formerly U. S. Government Research Reports) are available from the Superintendent of Documents, Government Printing Office, Washington, D. C., 20402:

Volume 38	Annual Cumulative Index January - December 1963 Includes "Non-Military and Older Military Research Reports" section only.	$1.00
	Cumulated Index May - December 1963 Includes Technical Abstract Bulletin only.	$3.50
	Collective Index 1 January - 1 May 1963 Includes Technical Abstract Bulletin only.	$3.50
Volume 37	Annual Cumulative Index January - December 1962 Includes "Non-Military and Older Military Research Reports" section only.	$1.00
	Semi-annual Cumulative Index July - December 1962 Includes Technical Abstract Bulletin only.	$3.50
	Semi-annual Cumulative Index January - June 1962 Includes both Technical Abstract Bulletin (TAB) and "Non-Military and Older Military Reports" sections.	$3.50
Volume 36	July - December 1961	$3.50
Volume 35	January - June 1961	$1.00
Volume 34	July - December 1960	$1.00
Volume 33	January - June 1960	$1.00
Volume 32	July - December 1959	$1.00

For information regarding the availability of earlier indexes write to the Clearinghouse for Federal Scientific and Technical Information, Springfield, Virginia, 22151.

RESEARCH highlights

Reports of current high industrial interest

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Bonding/Joining

SOLDERING DEVICE FOR THIN FILMS

A new soldering device produces good joints of consistent mechanical strength and low electrical resistance. The instrument prevents temperature rise at the tip and thus eliminates heat damage to thin film circuitry. It can solder components to films of extremely small thickness (2000-10,000 A). The new device consists of a nichrome tip, a soldering tip assembly, solenoids and timers, and a temperature control mechanism. In soldering, the substrate is immersed in isopropyl alcohol and blown dry with compressed air. The substrate is then mounted on the holding fixture and aligned with the aid of a microscope. The wire ribbon is coated or dipped in a liquid flux and is positioned directly under the solder tip and on the metallic tab to be soldered. Temperature control is set at 30 and the AC solenoid energized. The solder flow should be viewed under the microscope to determine the rate of wetting and any evidence of damage to the deposited film or substrate. Order from the Clearinghouse SC-TM-363-63-14, HC $1.00/MF 50 cents; SOLDERING TO THIN FILM CIRCUITRY.

Cleaning and Finishing

GETTING THE MOST OUT OF AN ULTRASONIC CLEANER

Two faulty operations must be guarded against to obtain good results with ultrasonic cleaners. The first concerns the positioning of the item to be cleaned. Major plane surfaces and cylindrical axes should be oriented in the fluid so that they are parallel to the direction of sound propagation. The second fault concerns the life of the cleaning fluid. Fluids always vary depending on the types of items being cleaned and must be changed often. Where critical applications demand the most thorough cleaning practicable, such as in the cleaning of electrical switching devices and close-tolerance mechanical systems, a two-cleaning sequence is usually effective--cleaning in one container and rinsing in another. Other helpful hints: Suspend all parts or cleaning aids from above and remove the parts while the cleaner is operating. Order from the Clearinghouse SC-TM-345-63-11, HC $1.00/MF 50 cents; GETTING THE MOST FROM YOUR ULTRASONIC CLEANER.

Electronics

DATA SHEETS ON GERMANIUM

A wide range of electrical, optical, and energy values for pure and variously doped germanium in bulk and film form are given in a compilation containing data sheets. The electrical properties include conductivity, resistivity, dielectric constant, Hall coefficient, mobility, lifetime, thermoelectric, and thermomagnetic effects. Energy data include energy bands, energy gap, and energy levels for variously doped germanium as well as effective mass tables, work function, carrier diffusion, and cross sections. The properties include absorption, reflection, and refractive index. AD-610 828, HC $6.00/MF $1.25; GERMANIUM DATA SHEETS. (This report cited in this issue, see page 113.)

Engineering and Construction

WORKSHOP ON TERMITE RESEARCH

Habits of termites in various areas of the country, present control measures, and research aimed at improved pesticides are among the many subjects discussed at the 1964 Workshop of Termite Research conducted jointly by the Armed Forces Pest Control Board, the National Pest Control Association, the Building Research Advisory Board, and Purdue University. A promising avenue of control discussed: both molds and bacteria in or near wood can attract, repel, or kill termites. For example, certain bacteria of the genus Serratia cause rapid mortality among subterranean termites. Soil inhabitants, the bacteria are the producers of the red discoloration in termites and cockroaches. It is not, however, the red color which is the toxicant. Researchers believe the deadly substance is some precursor or enzyme leading up to this end product. They are now actively studying the bacteria to determine the precise chemical that proves fatal to the termite. Order from the Clearinghouse AD-611 435, HC $3.00/MF 75 cents; PROCEEDINGS, THE WORKSHOP ON TERMITE RESEARCH. (This report cited in this issue, see page 92.)

Fibers and Textiles

DESIGN TABLES ON THE WEAVABILITY OF COTTON

Tables have been compiled to help find the solution for equations on cover and beta factors and on maximum weavability for the entire practical range of cotton yarn counts, textures, and basic weave types. The table on maximum weavability provides solutions to the equations for all of the basic weaves over a cover factor range of from 10 to 32 inclusive at intervals of 1, and over a beta factor range of from 0.5 to 2.0 at intervals of 0.1. It permits the determination of the maximum weavable constructions for oxford, plain, and 3- 4- and 5-harness weaves. The other two tables eliminate the need for computing cover and beta factors. They provide the solutions to the equations of these parameters for fabric textures of from 11 to 200 yarns per inch and for yarn numbers of from 1/1 to 84/1 equivalent. Order from the Clearinghouse AD-449 499, HC $3.00; DESIGN TABLES FOR COTTON FABRICS. (This report cited in this issue, see page S-21.)

Low-Temperature Materials and Processes

STRUCTURAL METALS FOR LOW-TEMPERATURE USE

There are at least 29 alloys that offer attractive mechanical properties at subzero temperatures. Among them are the austenitic stainless steels which retain high ductility at temperatures to -423°F. The simple single-phase structure of these alloys enables their excellent low-temperature properties to be maintained after welding. Alpha titanium alloys are appropriate choices when weight considerations are important. Aluminum alloys have slightly lower density but also appreciably lower strength than the titanium alloys. Nickel alloys display high ductility at very low temperatures in both solution-annealed and age-hardened conditions. On the other hand, metals with body-centered cubic crystal structure (such as iron, chromium, columbium, molybdenum, and tungsten) are generally severely embrittled at low temperatures. Ductility drops to practically zero, and fractures occur without any prior indication at stress levels below accepted design values. Order from the Clearinghouse N65-11046, HC 50 cents/MF 50 cents; EFFECTS OF LOW TEMPERATURES ON STRUCTURAL METALS.

Lubricants

BEARING SYSTEM DESIGN FOR HIGH-TEMPERATURE USE

For a high-temperature bearing system, the rolling element type appears to be best because of its small size, its light weight, and its self containment. A two-bearing system is recommended from a material standpoint: one for operation to 1000°F and another for operation from 1000 to 1500°F. The lower temperature bearing can consist of Stellite 3 races and Star J balls while the higher temperature bearing can be either Al_2O_3 balls and races or titanium carbide balls and races. Means must be found to actuate and switch from one bearing to the other. Solid lubricants are the most promising means of lubrication, particularly a gas-powder circulated type with predried MoS_2. Order from the Clearinghouse AD-611 171, HC $4.00/MF $1.00; INVESTIGATION OF COMPLEX BEARING AND/OR LUBRICATION SYSTEMS FOR HIGH SPEED, HIGH TEMPERATURE OPERATION. (This report cited in this issue, see page 70.)

Metalworking and Metal Forming

PREMIUM QUALITY ALUMINUM CASTINGS

Despite their higher cost as compared to conventional castings, premium quality aluminum castings have in many instances proved to be more economical than the forged or machined parts which they replace. This favorable rating results largely from the application of improved casting techniques, such as the use of high-purity ingot (low iron content). Adequate degassing and proper melting procedures as well as streamlined gating design to avoid turbulence and aspiration of mold gases are also recommended. Use should be made of a sufficient number of risers to feed the casting adequately, and sufficient chills should be imposed to control the solidification rate and provide directional solidification. The use of high-temperature solution heat treatment followed by artificial aging also helps develop maximum mechanical properties. Order from the Clearinghouse AD-611 021; HC $2.00/MF 50 cents; PREMIUM-QUALITY ALUMINUM CASTINGS. (This report cited in this issue, see page 129.)

Optics

GLASS FIBER LASERS USED AS AMPLIFIERS

A 1-meter-long glass fiber with a neodymium laser glass core can amplify a low level signal by a factor as large as 5×10^4. A similar fiber laser with high input signal shows saturated amplification. That is, with a series of input pulses spaced a few microseconds apart, the first pulse receives a greater amplification than the second and succeeding pulses. This is a type of refractory behavior which is fundamental to the neuristor concept. In order to obtain high values of amplification, it is necessary to prevent oscillation of the fiber lasers. This can be accomplished by beveling the ends of the fibers so that any rays reflected at the end surfaces are lost through the sides of the fiber. By thus preventing feedback and the resulting oscillation, a much larger inversion of active ions can be established. Order from the Clearinghouse AD-441 407, HC $4.00; DEVELOPMENT OF GLASS FIBER LASERS. (This report cited in this issue, see page S-45.)

Testing, Analysis

ELECTRON MICROPROBE FOR CHEMICAL ANALYSIS

Analytical chemistry techniques have been extended to analysis of areas as small as 1 micron in diameter by the electron probe x-ray microanalyzer. Through application of this instrument, a vast amount of knowledge has been accumulated in the general investigations of various materials in metallurgical, mineralogical, and other fields where the composition of small areas is of interest. Combinations of various electron probe techniques permit wide versatility in measurements and can provide considerable data on various types of samples. The instrument has been applied to such studies as (1) sample homogeneity, including identification of minor phases, (2) diffusion, (3) identification of sample components, and (4) identification of inclusions or foreign bodies. Extreme sensitivity and precision are possible, as, for example, in materials having a density in the range of 2 to 20 grams per cc., a total weight of about 10^{-12} to 10^{-14} grams can be detected. Order from the Clearinghouse LA-3157, HC $3.00/MF 75 cents; APPLICATIONS OF THE ELECTRON MICROPROBE TO CHEMICAL ANALYSIS.

RESEARCH REVIEWS PACKAGED for INDUSTRY

by

The Institute for Applied Technology
NATIONAL BUREAU OF STANDARDS

Highlighted here are the first ten in the series, A Review of Selected U.S. Government Research and Development Reports.

The publications, priced at 50 cents each, contain resumés, abstracts and bibliographies of Federally sponsored research and development reports gathered under titles of special interest to industry.

They and the reports they refer to may offer ideas for product development or suggest means of reducing costs. The series, as well as most of the reports reviewed in it, are available from the Clearinghouse. New titles are in process. Please order by OTR number.

HOT MACHINING (OTR-101)

Hot machining offers easier and cheaper turning and milling of many metals and alloys, Government studies indicate. According to a summary describing these studies, the greatest improvements possible in tool life, cutting speeds, and costs are for hardened low alloy and tool steels. On AISI 4340 steel hardened to 600 Brinell, the summary indicates, there is an increase of tool life of 20 times at 900°F over that at room temperature for the same cutting speed. The increase in tool life of Thermold J alloy tool steel may reach 40 times, and increases of 5 to 7 times are noted for stainless steels. Results of tests on face- and end-milling steels are similar to those for turning. Milling of nickel and cobalt alloy requires higher work temperatures but is improved by the use of asbestos to lubricate or reduce the tool impact. Order from the Clearinghouse OTR-101, 50 cents.

NICKEL-TITANIUM ALLOYS (OTR-102)

Intensive Government research is in progress on nickel-titanium and other malleable intermetallic compounds with unusual high-strength at elevated temperatures, wear and corrosion resistance, and elastic and damping properties. The studies should increase knowledge of workability and structural properties, making the alloys more useful to industry. A summary describing the investigations indicates the so-called Nitanol series of nickel-titanium alloys with from 52 to 56 weight percent nickel offers many potential applications in nonmagnetic tools, bearings, instruments, underwater structures, chemical handling equipment, cutlery, vibration absorption devices, temperature sensors, and wear resisting items. The alloys can be hot worked by extrusion, rolling, forging, or swaging down from ingot size at temperatures between 700 and 950°C. Hot-worked materials may then be worked at room temperatures with intermediate anneals. Alloys containing excess nickel (up to 62 percent by weight) are capable of being hot and cold worked with slightly more difficulty; however, they can be hardened by heat treatment to as high as 62 Rc. This hardness in a nonmagnetic corrosion-resistant material is exceptional. Order from the Clearinghouse OTR-102, 50 cents.

PHOTOCHROMISM and PHOTOTROPISM (OTR-103)

Government agencies have been responsible for important contributions in the fields of photochromisms and phototropism. Though the object of much of this research has been the development of eye protection against the flash of nuclear explosions, a summary describing the investigations indicates there are other potential applications for the findings. These include the development of objects for the control of sunlight exposure and/or snow glare, such as windows, window shades, windshields, and sunglasses, as well as optical memory devices for computers and valves for modulating or monitoring light. One project, for example, is aimed at development of a self-attenuating light valve as an eye-protective device. The researchers determined the properties of phototropic materials as well as design factors for a phototropic-type valve (filter). Such information, according to the summary, might be adapted to the design of light valves for both optical and nonoptical systems in which variation of the quantity of light is used in a modulating or monitoring capacity. Order from the Clearinghouse OTR-103, 50 cents.

FIRE--EXTINGUISHING MATERIAL TECHNOLOGY (OTR-104)

Both industries and communities stand to benefit from Government research in fire extinguishing materials. Though much of the research was aimed at solution of military and aerospace fire-control problems, a summary describing these investigations indicates a great deal of valuable information was gathered on some of the latest innovations for effective control of many kinds of fires. These include Class A type (ordinary flammable materials like wood) and Class B type (flammable liquids and gases). One particularly significant research project evaluated the effectiveness of increasing the viscosity of water by adding chemicals such as sulfonated polyvinyl toluene and carboxymethylcellulose. Large scale laboratory tests conducted by the Navy indicated a 75 percent improvement for such a mixture over plain water in Class A fire control. Researchers also determined optimum nozzle design and an effective sprinkler system for indoors. Order from the Clearinghouse OTR-104, 50 cents.

FLAME-RETARDANT TEXTILES (OTR-105)

Federal agencies are continuing efforts to improve the flame-resistance of fabrics. They have conducted important studies in such areas as fabric thermal conductivity and destructive temperatures as well as in testing apparatus to determine thermal behavior of fabrics. They have also sought to find coatings which make the more familiar materials such as nylon and cotton more fire-resistant. Much of this research has been successful and is of great value to industry, a summary describing the investigations indicates. The summary cites among several studies one that established the testing apparatus and analysis necessary to determine thermal conductivity of a fabric, the interface temperatures at the point of contact of the fabric with the backing materials, and the surface temperature at the point of contact with the flame. A triple treatment of divinylbenzene copolymer coated with tetrachlorodiamine and phosphonium chloride followed by copolymer coating to impart flame resistance to nylon was discovered in other research. A third study found certain catalysts to combine with tris-1-aziridinyl phosphone oxide to help produce durable flame resistancy in cellulosic fabrics. Order from the Clearinghouse OTR-105, 50 cents.

HUMIDITY-CONTROLLED WAREHOUSING (OTR-106)

Recent Government research has looked into preservation methods and the economics of storage in a variety of environments. Studies have also been made on storage of food, water, and equipment as well as on the design of humidity-controlled warehouses. The results of this research, according to a summary describing the studies, are of considerable value to manufacturers and others seeking to improve the storage life of materials. One 5-year study examined the effectiveness and economics of humidity-controlled storage of the following types of equipment: fluid-handling, motor-generators, automotive, heating, non-metallic, tools, instruments, and communications. Another study investigated the major aspects involved in successful warehousing, including identification and control of deterioration forces such as climate and corrosion. A third study discusses the use of thin metal-film corrosion indicators, devices that are sensitive to relative humidity above 40 percent and indicate the amount present by changes in color of the film-coated area from silver-gray to orange-brown. Order from the Clearinghouse OTR-106, 50 cents.

CONCRETE TECHNOLOGY (OTR-107)

Considerable progress has been made by Government laboratories and cooperating private research institutions in the improvement and application of concrete and its constituent materials during recent years. A summary describing these studies indicates they will help private industries initiate many improvements in existing products as well as establish new applications. One outstanding study described in the summary established that nylon and other plastic fibers when added to the mix, impart tremendous strength and resiliency to concrete. Nylon increases strength to more than 27 times that of unreinforced concrete. The plastic fiber additions may prove to be superior to steel wires because the latter increase flexural strength and shatter resistance but not resiliency. The summary discusses work in these major areas: (1) improvement of strength or decreased water transmission through conventional composition concrete; (2) improved shock resistance in lightweight concrete; (3) strength and corrosion protection of steel-reinforced concrete; (4) prestressed concrete applications; and (5) protective coatings for concrete. Order from the Clearinghouse OTR-107, 50 cents.

VOLATILE CORROSION INHIBITORS (OTR-108)

Studies carried out by Government agencies show that volatile corrosion inhibitors have potentially wide application in delivering products to the consumer in more ready-to-use condition. According to a summary prepared by technologists of the Institute for Applied Technology, National Bureau of Standards, volatile corrosion inhibitors will succeed when used with effective moisture resistant packaging materials. Researchers therefore developed a heat-sealable polyester material to be used with a volatile corrosion inhibitor to provide protection in very humid environments. Steel items so packaged withstood corrosive attack for 12 months in very humid environments and for longer periods in less humid storage areas. The summary describes studies carried out in three broad areas: evaluation of the time in which steel is fully protected under varying external conditions, effect of inhibitor materials upon nonferrous metals, and the effect of the outside packaging materials. Order from the Clearinghouse OTR-108, 50 cents.

GREASE LUBRICATION (OTR-109)

Research in grease lubrication conducted by Federal agencies will provide useful information to manufacturers and others. The studies determined how to increase the life of steel parts exposed to sliding, rubbing, and rolling friction, together with heavy loadings and vibrations. A summary describing this research discusses surfaces in contact with lubrication formulations, additives to reduce corrosion, and variations in method and degree of loading and vibration. Additives such as imide-type thickeners are possible for enabling greases to perform well at high temperatures, for example. One aluminum imide thickener tested has a melting point of over 1000°F. Twenty-one greases in various proportions are identified in another study discussed in the summary. Some of these formulations achieved favorable performance after prolonged periods of testing. The summary also gives bibliographies of reports. Order from the Clearinghouse OTR-109, 50 cents.

THERMOELECTRIC MATERIALS and FABRICATION (OTR-110)

Because thermoelectric generators enjoy several advantages over conventional power sources for low power application, considerable Government-supported R&D has been devoted to improving the efficiency and reliability of thermoelectric materials, while other projects have been concerned with determining methods and materials for joining thermoelectric materials to metallic connectors. Although not yet economically suitable for large scale energy conversion, actual units have been developed for certain specialty applications. Notable among these is a 35-pound propane fired portable generator which has demonstrated the capability of producing 267 watts. A 100-watt generator powered by radioisotopes operates at 554°C and 171°C hot and cold sides respectively and attains an overall efficiency of 5.2 percent. The principal advantages of these portable power packs are their small size and low weight, ease of maintenance, and silence of operation. They can be coupled to a variety of heat producing sources including engines and nuclear plants. Order from the Clearinghouse OTR-110, 50 cents.

TECHNICAL ABSTRACT BULLETIN

1. Aircraft and Flight Equipment

AD-611 532 Div. 1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EJECTION SEAT WITH HINGE SUSPENDED POWDER ACCELERATOR,
by N. V. Kirsanov. 11 Feb 65, 5p FTD-TT-64-943
TT 65-61777

Unclassified report

Unedited rough draft trans. of Russian patent 160,956, appl. no. 788,059/40-23, 21 Jul 62.

Descriptors: (*Ejection seats, Stabilization systems), Cartridges (PAD), Suspension devices, Center of gravity, Explosive actuators, Aerodynamic control surfaces, Aviation safety, Patents, USSR.

The ejection seat is characterized by the fact, that for the purpose of increasing the height of ejection and automatic stabilization of the ejected object in flight, the powder accelerator is hinge suspended above the CG of the seat and is provided with a stabilizer (aerodynamic flaps).

AD-611 534 Div. 1, 25
CFSTI Prices: HC$3.00 MF$0.75

Allied Research Associates, Inc., Concord, Mass.
THERMOELASTIC STRESS CONCENTRATIONS.
Rept. for Nov 63-Jan 65,
by Frederick Bird and Herbert Becker. Feb 65, 53p
Rept. no. ARA-F-257-12
Contract AF33 615 1241
FDL TDR-64-173

Unclassified report

Descriptors: (*Thermal stresses, Elasticity), (*Elasticity, Thermal stresses), Tensile properties, Stresses, Mathematical analysis, Deformation, Sheets, Rectangular bodies, Photoelasticity, Fatigue (Mechanics).

Thermal stress concentration factors were determined for rectangular flat plates, some of which were penetrated by holes and some which had filleted width changes. The experimental data indicate that the thermal stress concentration factors would be less than tension stress concentration factors for the same bars. Additionally, the peak thermal stress was found to be smaller in magnitude than the nominal applied thermal stress, except for one case in which the peak stress at the hole was 1.2 times the applied stress. (Author)

AD-611 552 Div. 1, 33
CFSTI Prices: HC$2.00 MF$0.50

Federal Aviation Agency, Washington, D. C.
Environmental Development Div.
FOG CHAMBER TESTS OF CATEGORY II APPROACH, TOUCHDOWN AND RUNWAY CENTERLINE LIGHTING SYSTEMS.
Interim rept.,
by Leslie C. Vipond. Nov 64, 50p Rept. no. RD-64-107
Proj. 430 201 01E

Unclassified report

Prepared from data obtained under Contract ARDS-434 by the University of California.

Descriptors: (*Fog, Landing aids), (*Landing aids, Lighting equipment), (*Landing lights, Runways), All-weather aviation, Night landings, Flight testing, Approach, Airports, Flight simulators.

The report describes testing of airport lighting systems in day and night fog conditions utilizing a very large chamber and producing fog by compressed air and water through nozzles installed along the side of the chamber. The test results reported are those for restricted visibility conditions defined as Category II, wherein the visual range was 1200 ft. Peak candlepower values and photometric distributions required for Category II operations were determined during the tests covered by this report. Various patterns of lights were installed on the floor of the chamber and simulated approaches and landings were made through the fog using a total of 36 experienced pilot observers. The observers rode in an airplane cockpit suspended from overhead rails. The tests showed that present visual aids could be considered adequate, although marginal, for Category II operations at night. In day time fog, however, the higher background brightness had a profound effect and made some of the standard components inadequate. (Author)

AD-611 553 Div. 1
CFSTI Prices: HC$2.00 MF$0.50

National Aviation Facilities Experimental Center, Atlantic City, N. J. Experimentation Div.
LIMITED SURVEY OF COMMERCIAL JET AIRCRAFT ALTIMETER SYSTEM POSITION ERROR BY PACER WITH TRAILING CONE.
Final rept.,
by Jack J. Shrager. Dec 64, 34p
Proj. 320 205 02X
FAA RD-64-157

Unclassified report

Descriptors: (*Altimeters, Tests), (*Jet planes, Altimeters), (*Commercial planes, Jet planes), Civil aviation, Aviation safety, Measurement, Airspeed, Errors, Graphics, Towed bodies.

Limited flight tests were conducted using the trailing cone static pressure measuring technique to determine the repeatability of commercial jet aircraft altimeter systems. The maximum difference between the six types tested at 30,000 feet was 500 feet. (Author)

AD-611 570 Div. 1, 19
CFSTI Prices: HC$0.50 MF$0.50

Naval Research Lab., Washington, D. C.
THE RAINBOW OPTICAL LANDING AID.
Interim rept.,

by Barbour Lee Perry. 1 Feb 65, 22p
Rept. no. NRL-6184
Proj. RS11 50 016 652 1F012 06 02
Unclassified report

See also AD-611 571.

Descriptors: (*Landing aids, Optical equipment), (*Night landings, Carrier landings), (*Glide path systems, Human engineering), Aviation safety, Guidance, Flight paths, Display systems, Colors, Sensitivity, Aircraft carriers, Errors, Geometry, Control systems, Effectiveness, Mathematical analysis.

The report describes the Rainbow Optical Landing Aid and contains a mathematical analysis of the pilot-aircraft-Rainbow-geometry loop. The analysis underscores the salient characteristics of the Rainbow display which lead to precise, easily controlled landings. The Rainbow Optical Landing Aid was developed to provide the pilot with quickened glide path information by means of a color-sequence coded signal. A red-white-blue sequence tells the pilot to increase his sink rate; a red-blue-white sequence indicates that a smaller sink rate is required. A steady green informs the pilot that he is within ±0.1 degree of glide path. Designed for location on the carrier deck, the Rainbow is strictly an optical-geometrical system requiring no electronics or external inputs. The experimental unit has been used at ranges up to 3.5 miles in bright sunlight, weighs less than 50 pounds, and cost less than $1,000. (Author)

AD-611 571 Div. 1, 19
CFSTI Prices: HC$0.50 MF$0.50

Naval Research Lab., Washington, D. C.
DESIGN EQUATIONS FOR RAINBOW OPTICAL LANDING AID.
Interim rept.,
by Carol A. Roberts. 5 Feb 65, 19p
Rept. no. NRL-6199
Proj. RS11 50 016 652 1F012 06 02
Unclassified report

See also AD-611 570.

Descriptors: (*Landing aids, Optical equipment), (*Night landings, Carrier landings), (*Display systems, Mathematical analysis), Equations, Design, Aviation safety, Guidance, Flight paths, Glide path systems, Colors, Errors, Geometry, Aircraft carriers.

The Rainbow Optical Landing Aid is a carrier-based landing display system which enables the pilot to control the rate of descent of his aircraft to a high level of accuracy. The system is purely optical-geometrical and requires no electronics. The command signal is presented as a color-coded array of lights, which is achieved by mounting color transparencies of exponential curves on a revolving transparent drum and by projecting the resultant pattern into space. The report is concerned with the color pattern on the revolving drum of the Rainbow optical landing display, including both the basic mathematical aspects of this pattern and its color coding. (Author)

AD-611 581 Div. 1
CFSTI Prices: HC$7.00 MF$2.00

Aeronautical Systems Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
CATEGORY II ARCTIC EVALUATION OF THE YCH-47A HELICOPTER.
Rept. for 10 Dec 63-6 Feb 64,
by Ronald E. Stanford and D. Bruce Griggs. Dec 64, 389p ASD-TDR-64-86 Unclassified report

Descriptors: (*Helicopters, Cold weather tests), Performance (Engineering), Flight testing, Arctic regions, Military requirements, Rotor blades (Rotary wings), Drives, Hydraulic systems, Electrical equipment, Flight control systems, Heating, Maintainability, Handling, Taxiing.

The YCH-47A helicopter was tested under arctic conditions at Eielson AFB, Alaska during the period 10 December 1963 to 6 February 1964. Testing consisted of flights both at moderately low (+ 10F to -20F) and very low temperatures (-20F to -30F) as well as ground operation down to -40F. Along with conducting an overall evaluation of the helicopter's effectiveness in a cold environment, a number of improvements to correct earlier low temperature deficiencies were tested and found adequate. This report contains a description of the test procedures, selected instrumentation data, a discussion of the deficiencies uncovered and recommendations for their correction. Problems encountered in the Arctic were instability arising from SAS (Stability Augmentation System) operation, delamination of rotor blade fiberglass skins, and extreme difficulty in ground handling on hard packed snow, ice, or similar slippery surfaces. In order for the helicopter to be suitable for low temperature operation, new or modified rotor blades with assured structural integrity must be incorporated along with other improvements recommended in this report. (Author)

AD-611 770 Div. 1, 19
CFSTI Prices: HC$4.00 MF$1.00

Sierra Research Corp., Buffalo, N. Y.
ECONOMIC ANALYSIS COMMERCIAL HELICOPTER IFR OPERATIONS.
Final rept.
14 Feb 64, 122p Rept. no. TR-0384
Contract FA WA4321, Proj. 115 6R
FAA RD-64-18
Unclassified report

Descriptors: (*Civil aviation, Helicopters), (*Helicopters, Civil aviation), (*Instrument flight, Costs), Pilots, Scheduling, Operations research, Feasibility studies, All-weather aviation, Air traffic control systems, Navigation, Economics, Analysis, Vertical take-off planes, Terrain, Meteorology, Graphics.

The report describes the results of a detailed study which was conducted to determine the potential economic effects of helicopter IFR operations on the scheduled and non-scheduled helicopter operators, considering all pertinent factors; and it is concluded that: (1) Scheduled helicopter operators would gain potential economic benefit from an IFR capability in varying degrees, dependent on locale and types of equipment operated. (2) Generally, non-scheduled operators would gain no economic benefit from an IFR capability, at present, because of the types of equipment operated and services performed. (3) An IFR capability, alone, will not substantially alter the subsidy situation of the scheduled helicopter operator. (Author)

AD-611 816 Div. 1, 2
CFSTI Prices: HC$6.00 MF$1.25

Travelers Research Center, Inc., Hartford, Conn.
INITIAL IMPLEMENTATION TESTS OF WEATHER SUPPORT TO THE NATIONAL AIRSPACE SYSTEM.
Final rept.,
by Lawrence J. Reed. Dec 64, 203p
Contract FA WA4644, Proj. 206 1R
SRDS RD-64-147
Unclassified report

Descriptors: (*Weather forecasting, Data processing

systems), (*Data processing systems, Weather forecasting), (*All-weather aviation, Weather forecasting), Meteorological parameters, Statistical analysis, Programming (Computers), Weather communications, Digital computers, Systems engineering, Tests.

The initial phases of a quasi-real-time test of the use of computer programs employing modern weather techniques, reported here, examined their performance under operational conditions. Criteria were: estimates of feasibility, meteorological accuracy, and timeliness. Analyses and forecasts were prepared from live data. The results were not transmitted to aviation users. Two meteorological techniques were tested; (a) a statistical method for predicting ceiling and visibility up to seven hours, and (b) an analysis method based on elements reported from ground stations, e.g., ceiling, visibility, pressure, temperature, dew point, wind speed, and precipitation. The implementation of modern weather techniques is feasible. Many problems were met, none were insurmountable. Meteorological accuracy of the techniques could deteriorate significantly due to missing and/or erroneous data. Standardization and improvement of codes and communications discipline would help. Forecasts and analyses were ready for communications by 30 minutes after observation time. Significant improvement in timeliness can be achieved by utilizing real-time data channels, minimizing the use of magnetic tape in data processing, and rewriting new operational computer programs in lieu of re-programming developmental programs. (Author)

AD-611 825 Div. 1
CFSTI Prices: HC$2.00 MF$0.50

Litton Systems, Inc., St. Paul, Minn.
DETERMINATION OF THE SHAPE OF A FREE BALLOON. BALLOONS WITH SUPERPRESSURE, SUBPRESSURE AND CIRCUMFERENTIAL STRESS: AND CAPPED BALLOONS,
by Justin H. Smalley. 22 Apr 64, 42p
Rept. no. 2560, Scientific rept. no. SR-3
Contract AF19 628 2783, Proj. 6665, Task 666501
AFCRL 65-72

Unclassified report

See also AD-610 125.

Descriptors: (*Balloons, Geometric Forms), Stresses, Pressure, Configuration, Inflatable structures, Aerodynamic loading, Aerodynamic characteristics, Numerical methods and procedures.

Results of the computation of the shape of an axisymmetric free balloon are presented. Flat-top balloons with superpressure, with subpressure, and balloons with circumferential stress are considered. Circumferential stress is both held constant and varied as a function of meridional stress. Certain limitations on circumferential stress are noted. Shapes, meridional stresses, and circumferential stresses are presented. In addition, similar results are presented for capped balloons with a double-weight cap covering the upper half of the balloon. (Author)

AD-612 007 Div. 1
CFSTI Prices: HC$3.00 MF$0.75

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
REPRESENTATION OF PROPELLER WAKES BY SYSTEMS OF FINITE CORE VORTICES.
Summary rept. for Feb 63-Dec 64,
by W. Gordon Brady and Peter Crimi. Feb 65, 74p
Rept. no. CAL-BB-1665-S-2
Contract Nonr369100, Projs. RR011 05, NR215 004

Unclassified report

Descriptors: (*Propellers (Aerial), Wake), (*Wake, Simulation), (*Vortices, Wake), Rotary wings, Aerodynamic configurations, Aerodynamic characteristics, Aerodynamic loading, Mathematical models, Numerical analysis, Flight, Velocity, Distribution.

The report discusses the development of a propeller wake model and computational procedure aimed at the determination of the spatial distribution of wake vorticity and the associated induced velocity distribution. Numerical calculations were made for a number of vortex-ring configurations corresponding to a hovering rotor at one-half, one and two ring radii above the ground, as well as out-of-ground effect. Both unsteady and time-averaged velocities were computed at various points in the wake for several cases. A model is proposed for the wake flow of a rotor in steady forward flight. Instead of the vortex-ring representation, the tip vortices are represented by continuous finite-core vortices. For purposes of numerical calculation, the continuous vortex is approximated by short straight-line segments. This model will enable the calculation of the time-dependent wake-vortex configuration, within the limitations of practicable computing running time, in which the various vortex elements move under mutual influence according to the laws of vortex dynamics. (Author)

AD-612 011 Div. 1
CFSTI Prices: HC$3.00 MF$0.75

Lockheed-California Co., Burbank, Calif.
WIND TUNNEL TESTS OF AN OPTIMIZED, MATCHED-STIFFNESS RIGID ROTOR,
Nov 64, 64p Rept. no. Lockheed 17790
Contract DA44 177AMC78T, Proj. 1D121401A142
TRECOM TR-64-56

Unclassified report

Descriptors: (*Rotary wings, Model tests), (*Rotor blades, (Rotary wings), Model tests), Aerodynamic configurations, Torque, Trailing control surfaces, Force (Mechanics), Wind tunnels, Aerodynamic loading, Subsonic flow, Physical properties, Design, Simulation, Graphics.

A 10-foot-diameter model of a new type of rigid rotor was tested in the Freon atmosphere of a transonic dynamics tunnel at simulated speeds up to 263 miles per hour. Configurations having 3, 4, and 6 blades with zero blade twist and a 4-blade configuration with six degrees of negative twist were tested. A flexure system eliminated the usual feathering bearings. While a true matched stiffness rotor would have flapping and in-plane stiffness matched along the full length of the blade, the system tested had stiffness matched only in the blade flexure region. The tests were successful, and this new type of rigid rotor appears to offer substantial advantages over previous stiff in-plane rigid rotors by reducing: rotor weight, gyro weight and drag, hub drag, control forces, and mechanical complexity. (Author)

AD-612 023 Div. 1, 2, 15
CFSTI Prices: HC$3.00 MF$0.75

Dayton Univ., Ohio. Research Inst.
ERROR ANALYSIS AND COMPUTATIONS OF WIND SPEED AND WIND DIRECTION FROM AIRCRAFT DOPPLER DATA.
Scientific rept. no. 1,
by Marie Durling, Nicholas Engler, and Donald Kahle.
Aug 64, 66p
Contract AF19 628 2402, Proj. 8604, Task 7860402
AFCRL 64-703

Unclassified report

Descriptors: (*Wind, Flight speeds), (*Airspeed,

Errors), (*Groundspeed, Errors), Doppler effect, Drift, Mathematical analysis, Trigonometry, Wind-direction indicators, High altitude, Reconnaissance planes.

The use of a piloted aircraft to determine the magnitude and direction of the wind speed vector involves the direct measurement and recording of several basic parameters, such as ground speed, drift angle and air speed from which the wind speed vector is computed trigonometrically. This paper describes the significant mathematical relationships among these basic parameters, their errors and the resultant errors in wind speed and wind direction. After development of the general error equations, examples are given using Aircraft APN 102 Doppler data from typical flights made by a high altitude reconnaissance aircraft. (Author)

AD-612 072 Div. 1, 27
CFSTI Prices: HC$3.00 MF$0.75

Douglas Aircraft Co., Inc., Long Beach, Calif.
CRUISE CONTROL OF TURBOJET AIRCRAFT.
Revised ed.,
by C. G. Livingston. 5 Feb 65, 77p Rept. no. LB-31183A
Contract Nonr1076 00
AD 296 530 superseded
Unclassified report

Revision of rept. dated 21 Jan 63.

Descriptors: (*Turbojet engines, Flight paths), (*Flight paths, Control systems), (*Display systems, Turbojet engines), Jet propulsion, Optimization, Drag, Fuel consumption, Wind, Automatic pilots, Mathematical analysis, Operations research, Energy management.

A general technique is presented for cruise control of turbojet powered aircraft. The technique is evolved through the effects of imposed constraints and external forces to an integrated display system that will enable the pilot to optimize cruise management under all realistic conditions. Requirements are defined and the preliminary effort necessary for the commencement of a program for development of the total system is completed.

AD-612 181 Div. 1, 9, 23
CFSTI Prices: HC$8.05 MF$2.50

Air Force Flight Test Center, Edwards AFB, Calif.
AERODYNAMICS HANDBOOK FOR PERFORMANCE FLIGHT TESTING, VOLUME I.
Jul 60, 503p Rept. no. AFFTC TN-60-28
Unclassified report

Prepared in cooperation with USAF Experimental Flight Test Pilot School, Edwards AFB, Calif.

Descriptors: (*Aerodynamic characteristics, Handbooks), (*Flight testing, Handbooks), Pilots, Students, Education, Aircraft, Drag, Airfoils, Acceleration, Performance (Engineering), Aerodynamic loading, Thermodynamics, Fluid mechanics, Atmosphere, Propellers (Aerial), Jet engines, Aircraft engines, Flight, Instrumentation, Climbing, Descent, Theory.

Contents:
Fundamental review
Basic aerodynamic summary
Performance
Power plants
Instrumentation.

AD-612 184 Div. 1
CFSTI Prices: HC$2.00 MF$0.50

David Taylor Model Basin, Washington, D. C.
A WIND-TUNNEL INVESTIGATION OF SOME SHORT-CHORD LOW-SOLIDITY SHROUDED PROPELLERS IN THE CRUISE CONDITION,
by William B. Maguire. Nov 64, 31p
Rept. nos. 1919, Aero-1083
Unclassified report

Descriptors: (*Shrouded propellers, Performance (Engineering)), (*Shroud rings, Aerodynamic characteristics), Flight, Model tests, Configuration, Thrust, Airfoils, Pitch (Motion), Moments, Pressure, Drag, Lift, Vertical take-off planes, Short take-off planes, Wind tunnels, Experimental data.

Two basic shrouds were investigated, each with a two- and a three-bladed propeller. Performance data in pitch were obtained. The report contains the results of the investigation, and includes information pertaining to the cruise performance of two powered shrouded propeller configurations with nominal length-to-diameter ratios of 0.1 and 0.2. Propulsive efficiencies in excess of eighty percent were obtained at thrust coefficients as low as 0.07. (Author)

AD-612 257 Div. 1, 14, 17, 26
CFSTI Prices: HC$3.00 MF$0.75

Battelle Memorial Inst., Columbus, Ohio
THE STUDY OF SLEEVE BEARINGS IN AIRCRAFT SUPPORT STRUCTURES. THE DEVELOPMENT OF DESIGN DATA FOR MIL-HDBK-5 CONCERNING AIRFRAME BEARINGS.
Summary rept.,
by W. A. Glaeser, D. W. Nicholson, and C. M. Allen.
27 Aug 62, 65p
Contract NOw60 0496C
Unclassified report

Descriptors: (*Journal bearings, Airframe bearings), (*Airframe bearings, Journal bearings), Surfaces, Steel, Aluminum alloys, Bronze, Halocarbon plastics, Metals, Impregnation, Composite materials, Molybdenum compounds, Sulfides, Coatings, Friction, Lubricants, Lubrication, Temperature, Loading mechanics.

The performance of steel shafts oscillating in bearing surfaces of aluminum bronze, Teflon-impregnated metal, Teflon woven fabric, MoS2 coatings, and high-strength steels have been determined experimentally. The parameters studied include bearing load, wear, coefficient of friction, lubricants, and ambient temperature. Two bearing designs were used. One oscillation amplitude and frequency was used. The data of the aluminum bronze bearing evaluations have been rearranged in design-chart forms intended for use by bearing designers. Coefficient of friction values and wear data for various other lubricants and conditions are also presented. (Author)

AD-612 366 Div. 1, 2
CFSTI Prices: HC$2.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ATMOSPHERIC TURBULENCE AND THE STABILITY OF FLIGHTS IN ZONE OF TROPOPAUSE AND JET STREAMS,
by N. F. Gel'mgol'ts. 23 Feb 65, 45p
FTD-MT-64-297
TT 65-61808
Unclassified report

Edited machine trans. of Gidrometeorologicheskii Institut, Leningrad. Trudy (USSR) 1963, no. 19, p. 3-30.

with identification of product ions and some state selection of primary ions. Electric impact studies of molecular oxygen with high resolution provided new important information on the ionization process, while investigations of negative ions in afterglows of atmospheric gases demonstrated the comparative lack of understanding in this important aspect of atmospheric deionization. The following reactions were studied by the ionization afterglow technique: ionic recombination in O2; thermalization diffusion and electron-ion dissociative recombination in N2; attachment in gases containing NO2; attachment and electron-ion dissociative recombination in gases containing NO. (Author)

AD-610 873 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Service, Ottawa (Ontario).
SIGNS OF RECENT SUBMARINE VOLCANIC ACTIVITY IN THE LOMONOSOV RANGE,
by Y.Y. Hakkel'. Jun 58, 7p T-296-R
TT 65 61629

Unclassified report

Trans. of Priroda (USSR) 1958 v. 47, no. 4, p. 87-90.

Descriptors: (*Volcanoes, Arctic Ocean), (*Arctic Ocean, Volcanoes), (*Marine geophysics, Volcanoes), Seismology, Ocean bottom, Arctic regions, Ice islands, Marine geology, USSR.

A seismically active belt which extends close to the sub-oceanic Lomonosov Range of the Arctic Ocean basin was investigated. Research was conducted from research station North Pole 3, located on an ice field. At three locations the Cores obtained had a content of volcanic glass. The three points where volcanic glass was discovered lie on a single straight line which may indicate a deep fault in the terrestrial crust, passing almost over the North Pole.

AD-610 874 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
PHASE-METHOD STUDY OF LARGE-SCALE INHOMOGENEITIES IN THE IONOSPHERE,
by S. F. Mirkotan and L. A. Drachev. Jan 59, 3p
T-314-R
TT 59-15570; TT 61-17586

Unclassified report

Trans. of Mazhdunarodnyi Geofizicheskii God. Informatsionnyi Byulleten (USSR) 1958, no. 4, p. 56-57.

Descriptors: (*Ionospheric disturbances, Phase studies), Ionospheric propagation, Phase measurement, Ionosphere, USSR, Statistical analysis, Drift, Velocities.

The phase method consists in recording, at three mutually separated points on the earth's surface, the variations of phase-path of the reflected field from the ionosphere. This method has certain advantageous features as compared with existing methods of studying large-scale inhomogeneities and their movements (for instance, measurement of group retardation). An important feature of the phase method is an increased precision of recording the phase-path variation, which makes possible a statistical approach in calculating drift velocities from observations of large-scale inhomogeneities. In addition, it is useful to compare the phase measurements with other methods of investigating the fine structure of the ionosphere.

AD-610 875 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Army Engineer Research and Development Labs., Fort Belvoir, Va.
CHOICE OF CONTOUR INTERVAL IN REPRESENTING SANDY RELIEF ON 1:25,000 SCALE MAPS,
by M. I. Khmel'nitskaya. 1964, 10p T-1768
TT 65 61630

Unclassified report

Trans. of Geodeziya i Kartografiya (USSR) 1964, no. 7, p. 55-62.

Descriptors: (*Mapping, Deserts), Sand, Maps, Terrain, USSR.

This article proposes a combination of 2.5- and 5-meter intervals. Negative and positive relief forms are distinguished on the map by the use of hachures. The minimum area of negative forms which may be differentiated on a 1:25,000 topographic map is determined to be about 2 sq mm. For positive relief forms this limit may be slightly reduced, since in this case the hachures are directed outwards from the closed contour line. In mapping the relief of sandy deserts to a scale of 1:25,000, relief forms with an area of not less than 2 sq mm may be plotted on the map.

AD-610 881 Div. 2
CFSTI Prices: HC$3.00 MF$0.75

Directorate of Scientific Information Services, Ottawa (Ontario).
ARCTIC ICE AND THE WARMING OF THE ARCTIC,
by N. N. Zubov. Aug 58, 90p T-14-R
TT 65 61631

Unclassified report

Trans. of mono. V Tsentre Arktiki (In the Center of the Arctic) Moscow/Leningrad, 1948, chaps. 6 and 7.
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Descriptors: (*Ice, Arctic regions), (*Arctic regions, Ice), Glaciers, Ice islands, Sea water, Phase studies, Crystallization, Permafrost, Climatology, Meteorology, Marine biology, USSR.

Contents: Chapter 6: How the ice is formed; how the ice disintegrates; the limiting thickness of ice-formation; the ice-packs; glaciers; ice cap islands; icebergs; permafrost and fossil ice; ice and ice life; ice-drift; the ice stream; and more about the isobaric ice-drift. Chapter 7: The warming of the Arctic.

AD-610 885 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
SEASONAL DISTRIBUTION OF SHORT-PERIOD OSCILLATIONS OF THE TERRESTRIAL ELECTROMAGNETIC FIELD,
by M. V. Okhotsimskaya. Sep 56, 4p T-228-R
TT 65 61635

Unclassified report

Trans. of Akademiya Nauk SSSR, Izvestiya, Seriya Geofizicheskaya 1956, no. 8, p. 999-1000.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Electromagnetic fields, Geophysics), (*Periodic variations, Electromagnetic fields), Terrestrial magnetism, Sunspots, Magnetic storms, Oscillation, USSR.

This note concerns variations of the two most frequently encountered types of oscillations. Type one consists of long-continuous steady oscillations, which have their diurnal maximum of occurrence about 4 hr GMT. Type two oscillations occur in short bursts or trains. Their maximum of occurrence is about 19 hr GMT. These variations are illustrated along with portions of ordinary earth-current recordings. Maximum occurence of the oscillations was during the spring and autumn months.

AD-610 889 Div. 2, 25
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
RE THE INFRARED EMISSION OF THE NIGHT SKY AND THE AURORA,
by B. A. Bagaryatskii, V. I. Krasovskii, and M. I. Mordukhovich. 4 Feb 54, 4p T-121-R
TT 65 61621

Unclassified report

K Voprosu ob Infrakrasonom Izluchenii Nochnogo Neba i Polyarnykh Siyanii, trans. of Akademiya Nauk SSSR. Doklady, 1952, v. 82, no. 4, p. 579-580.

Descriptors: (*Aurora, Spectra (Infrared)), (*Night sky, Spectra (Infrared)), (*Infrared radiation, Meteorological phenomena), Sky brightness, Luminescence, Photometers, Infrared spectroscopy, Northern Hemisphere, Geophysics, Atmosphere, Optics, USSR.

In a previous communication (Dok. Akad. Nauk., 82, 1 (1952)) the auroral spectra in the infrared region from 8000 to 11,000 Å, obtained in March 1951, was described. In this paper the results of the photometry of the spectra are presented in tabular form. Four of the five spectrograms represent auroral spectra, and one is a spectrum of the night sky luminescence taken during the same period on a night when there was no aurora. The table gives the density of the negatives in the regions of maximum blackening, and the relative intensity, calculated therefrom, of the emission in the corresponding regions of the spectrum. In graphing the intensity, the intensity of the emission in the 7800 A region of the auroral spectrum was taken as 100, and the relative intensities of the night sky luminescence are shown in terms of this unit.

AD-610 891 Div. 2,4
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
PROBLEMS IN THE MIGRATION OF NICKEL,
by A. A. Smurov. 22 Dec 53, 9p T-96-R
TT 65 61622

Unclassified report

Trans. of Sovetskaya Geologiya (USSR) 1939, v. 9, no. 12, p. 68-73.

Descriptors: (*Nickel, Geochemistry), (*Ores(Metal sources), Nickel), (*Geochemistry, Nickel), Hydrology, Carbonate minerals, Erosion, Gels, Carbon dioxide, USSR.

It is shown that the role of carbonated hydrothermal waters in the formation of deposits of nickel ores is very doubtful. Experimental findings shown that, while the possibility of certain quantities being carried off by carbonated hydrothermal waters cannot be denied, these are small quantities only, playing an insignificant role in natural processes. The accumulation of nickel ores is due basically to the surface processes of weathering and leaching of serpentinites by ground water containing carbon dioxide. The study of natural waters associated with serpentinites shows that these processes are actually taking place; hence there are no data to support a denial of the possibility of nickel ore accumulation in our present epoch. This conclusion is especially confirmed by finds, in recent years, of quite fresh semi-liquid gels of nickel silicates.

AD-610 892 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
SOME SCIENTIFIC RESULTS OF THE WORK OF THE GEOPHYSICAL PARTY, SOVIET ANTARCTIC EXPEDITION,
by S. M. Mansurov. May 61, 5p T-353-R
TT 61-22898

Unclassified report

Trans. of Sovetskaya Antarkticheskaya Ekspeditsiya 1955- (USSR) 1960, v.9, p. 6-0.
Also available from NRC mi$1.00, ph$1.50 as NRC-C-3673.

Descriptors: (*Polar regions, Geophysics), (*Geophysics, Polar regions), Terrestrial magnetism, Aurora, Ionosphere, Cosmic rays, Seismology, Earth, Electric currents.

Contents (results of Second Continental Expedition of 1956-58):
Geomagnetism and aurora
Ionosphere
Earth currents
Cosmic rays
Seismology.

AD-610 896 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
A THEORY OF THE MOVEMENT OF DROPLETS IN AN ANABATIC CURRENT OF AIR SUBSATURATED OR SUPERSATURATED WITH VAPOR, AND ITS POSSIBLE METEOROLOGICAL APPLICATIONS,
by B. V. Deryagin and O. M. Todes. 9 Aug 50, 7p T-22-R
TT 59 10787

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady 1948, v. 62, no. 1, p. 93-96.

Descriptors: (*Drops, Atmospheric motion), (*Water vapor, Atmospheric motion), Meteorological parameters, Atmospheric condensation, Convection, Diffusion, Evaporation, Meteorology.

If a droplet has an equilibrium vapor pressure different from the vapor pressure of the surrounding medium, then two processes will be simultaneously taking place: the fall of the droplet and a change in its radius. It is shown that the simultaneous consideration of both phenomena leads to interesting and unexpected results which are of particular meteorological significance.

AD-610 901 Div. 2, 12, 30
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
STUDY OF THE GEOMAGNETIC FIELD FROM ARTIFICIAL SATELLITES AND ROCKETS,
by N. V. Pushkov and S. Sh. Dolginov. Apr 58, 16p T-276-R Unclassified report
TT 61-17585

Trans. of Uspekhi Fizicheskikh Nauk (USSR) 1957, v. 63, no. 4, p. 645-656.
Also available from NRC as NRC-C-2667.

Descriptors: (*Terrestrial magnetism, Measurement), (*Satellites (Artificial), Atmospheric sounding), (*Sounding rockets, Atmospheric sounding), (*Atmospheric sounding, Terrestrial magnetism), Magnetometers, Magnetic fields, Ionosphere, Geophysics, USSR.

The problems associated with the carrying out of geomagnetic measurements from artificial satellites and rockets, in order to secure experimental data on the spatial distribution of the terrestrial magnetic field at high altitudes are discussed. Some geophysical and technical aspects of this type of measurements are also reviewed.

AD-610 902 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
OBSERVATION OF THE MAGNETIC EFFECT OF METEORS BY AN INDUCTION METHOD,
by A. G. Kalashnikov. May 54, 6p T-130-R
TT 65-61638
Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1949, v. 66, no. 3, p. 373-376.

Descriptors: (*Meteors, Magnetic properties), (*Terrestrial magnetism, Meteors), Inductance, Magnetic fields, Measurement, Graphics, USSR, Ionospheric disturbances, Electric fields.

The results of all the observations indicate that the characteristic peaks detected on the curve of variation of the vertical component of the terrestrial magnetic field are apparently due to the magnetic effect of meteors. This effect sometimes has two phases of development. Motion is a major factor in each phase.

AD-610 903 Div. 2, 20
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
EFFECT OF RADIOACTIVE DECAY ON THE THERMAL REGIME OF THE EARTH AND THE ROLE OF THERMAL CONDUCTIVITY IN THE THERMAL REGIME OF THE EARTH,
by E. A. Lyubimova. Nov 54, 23p T-145-R
TT 65-61639
Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Geofizicheskaya, 1952, no. 2, p. 3-14; 1953, no. 6, p. 523-525.

Descriptors: (*Earth, Thermal conductivity), (*Radioactive decay, Heating), (*Thermal conductivity, Earth), Natural radioactivity, Lithosphere, Thermodynamics, Geophysics, Numerical methods and procedures, USSR.

A solution of the thermal conduction equation is given for a sphere which is heated internally by radioactive sources of heat, of an intensity decreasing with time. The solution, obtained by the method of reflections, is stated in terms of a rapidly converging series, which makes it possible to calculate the variation of temperature at any depth within the earth. Also given are the results of calculations of the internal temperature and the surface geothermic gradient for the case of a uniform distribution of radioactive elements throughout the volume of the earth and with the heat conductivity, thermal capacity and density constant at all points: that is, for a homogeneous model of the earth. Finally, the results of calculations of the temperature in a homogeneous earth-model under different assumptions are presented.

AD-610 904 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
DECREASING DURATION OF FREEZE-UP AS RELATED TO THE WARMING OF THE CLIMATE,
by S. S. Sokolov. 26 Aug 55, 5p T-197-R
TT 65-61640
Unclassified report

Trans. of Priroda (USSR) 1955, v. 44, no. 7, p. 96-98.

Descriptors: (*Climatology, Freezing), (*Freezing, Climatology), Ice, Melting, Periodic variations, Rivers, Lakes, USSR.

The climatic warming effect on the ice-cycle of the Neva River at Leningrad is investigated. Observations of the break-up and freeze-up of the river have been made interruptedly from the day the city was founded. The results of processing this material and the calculated deviations from the norm for each decade are given in tabular form.

AD-610 905 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
NEOTECTONIC MOVEMENTS IN THE ARCTIC REGION,
by D. G. Panov. Oct 55, 6p T-204-R
TT 59-15699
Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1955, v. 104, no. 3, p. 462-465.

Descriptors: (*Arctic regions, Terrain), (*Geophysics, Arctic regions), Glaciers, Seacoast, Arctic Ocean islands, Arctic Ocean, North America, Europe, Asia.

Neotectonic movements on the arctic coasts of the Eurasian and North American continents, the continental shelf areas, the archipelagos within the shelf region, and the oceanic depressions are described briefly with reference to the influence of the Quarternary glaciation.

AD-610 906 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE NORTHERN END OF THE HAWAIIAN SUBOCEANIC RIDGE,
by P. L. Bezrukov and G. B. Udintsev. Jan 56, 6p T-205-R
TT 65-61641
Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1955, v. 103, no. 6, p. 1077-1080.

Descriptors: (*Pacific Ocean, Ocean bottom topography), (*Ocean bottom topography, Pacific Ocean), Hydrographic surveying, Oceanographic data, Mountains, Underwater, Hawaii, Midway, USSR.

AD-610 907 Div. 2, 30
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
A NEW ACHIEVEMENT OF SOVIET MARINE GEOLOGY (THE SYSOYEV-KUDINOV HYDROSTATIC CORE-SAMPLER),
by A. P. Lisitsyn, V. P. Petelin, and G. B. Udintsev.
Dec 55, 9p T-206-R Unclassified report
TT 65-61642
Trans. of Priroda (USSR) 1954, v. 43, no. 6, p. 63-66.

Descriptors: (*Marine geology, Well logging), (*Well logging, Ocean bottom), (*Samplers, Well logging), Hydrostatic pressure, Pneumatic devices, Oceanographic equipment, Stratigraphy, USSR.

This device consists of a steel cylinder designed to stand considerable pressure, a valve mechanism, and the core tube. The valve mechanism closes the tank off before the apparatus is lowered away, and opens it automatically when the tube touches sea bottom. The core tube is in sections and thus may be of different lengths, according to the task in hand and the operating conditions. The inside diameter of the tube is 60 mm. Assembly of the tube and its lowering are handled by means of a special auxiliary device, and outboard rack along the ship's side. The chief merit of the sampler is claimed to be its ability to take cores of considerable length with an excellent quality of the soil sample.

AD-610 908 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ACHIEVEMENTS OF SOVIET GEOGRAPHIC EXPLORATION AND RESEARCH IN THE ARCTIC,
by V. F. Burkhanov. Jul 57, 33p T-253-R
TT 65 61643
Unclassified report

Trans. from mono. Cherez Okean na Dreifuyushchikh L'dakh (Across the Ocean on Drifting Ice) Moscow, 1956.

Descriptors: (*Arctic regions, Geography), (*Geography, Arctic regions), Polar regions, Exploration, History, Scientific personnel, Oceanology, Meteorology, Geology, Geophysics, Ice, USSR.

An historical account of Russian exploration of the Great Northern Sea Passage, extending through the border-seas of the Soviet Arctic ... the Barents, Kara, Laptev, East Siberian and Chukchee Seas ... along the northern coasts of Europe and Asia, is presented. Some results of scientific observations in the fields of meteorology, oceanology, and geophysics are also presented.

AD-610 910 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
SOVIET ARCTIC RESEARCH,
by V. F. Burkhanov. Nov 57, 15p T-265-R
TT 65-61668
Unclassified report

Sovetskie Issledovaniya Arktiki, Trans. of Priroda (USSR) 1957, v. 46, no. 5, p. 21-30.
Also available from NRC as C-2515.

Descriptors: (*Arctic regions, Structural geology), (*Arctic Ocean, Oceanographic data), Ocean bottom topography, Arctic Ocean islands, Marine geophysics, Hydrographic surveying, Mountains, Glaciers, Ice, Ocean currents, Temperature, Salinity, USSR.

Studies were conducted by aircraft and drifting research stations in 1956 of the Northern Maritime Route with a view toward opening the Arctic regions of the USSR. The entire Arctic Ocean was covered by reconnaissance studies, and data on the distribution of Atlantic and Pacific Ocean water in the Polar Basin and the character of the ice cover were collected. Extensive subterranean mountain ranges were traced, but the deep-water Arctic Basin on the Canadian Arctic Archipelago was not checked. A study of this area would yield information bearing on the general tectonic scheme of the entire North Arctic Ocean. The question of a connection between the Atlantic and the Pacific Oceans was studied by test borings of the Beaufort Sea bottom, and life was found on the ocean surface. Observations were made on thawing, growth, disintegration of floating marine ice, and the formation of crevasses. The investigations provided data concerning the regularities of iceberg formation and their drift paths. Radar observations of the aurora were also conducted.

AD-610 911 Div. 2, 5
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
FIRST RESULTS OF UPPER ATMOSPHERE OBSERVATIONS,
by V. I. Krasovaskii. Jan 58, 3p T-278-R
TT 65-61644
Unclassified report

Trans. of Priroda (USSR) 1957, v. 46, no. 12, p. 87-88.

Descriptors: (*Upper atmosphere, Scientific research), Night sky, Aurorae, Electron density, Emissivity, Excitation, Arctic regions, Radio communication systems, Microanalysis, Spectroscopy, USSR.

A popularized discussion is presented concerning information obtained and plans for future research and observation.

AD-610 912 Div. 2, 12
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
VISUAL OBSERVATIONS OF ARTIFICIAL SATELLITE,
by A. D. Zamorskii. Jan 59, 5p T-313-R
TT 59-15279; TT 61-17587
Unclassified report

Trans. of Priroda (USSR) 1958, v. 47, no. 11, p. 85-87

Descriptors: (*Satellites (Artificial), Visibility), Meteorological parameters, Solar radiation, Colors, Brightness, Clouds, Reflection, USSR.

The visual observation of artificial satellites and the meteorological information that may be derived from such observation are discussed. Particular emphasis is placed on the brightness and colors reflected by these satellites with respect to the spectral variations of sunlight in its passage through the terrestrial atmosphere.

AD-610 913 Div. 2, 25
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
PHOTOELECTROMETRIC STUDY OF THE NIGHT SKY LUMINESCENCE,
by L. G. Bol'shakova, Yu. N. Georgievskii, A. N. Otto, and S. F. Rodionov. Jan 59, 4p T-315-R
TT 59-15571; TT 61-17583

Unclassified report

Trans. of Mezhdunarodnyi Geofizicheskii God. Informatsionnyi Byulleten' (USSR) 1958, no. 4, p. 58-59.

Descriptors: (*Luminescence, Night sky), (*Night sky, Luminescence), Infrared radiation, Diurnal variations, Measurement, Photometers, Geophysics, USSR.

The Leningrad University night-sky research equipment was automatized and converted to continuous recording. Measurements obtained in the summer and autumn of 1956 in the Elbruz region at heights of 2200 and 3900 m above sea level are presented. The diurnal variation curves for the 3900-m altitude are much smoother than the curves for 2200 m. The variations at 2200 m were caused by changes in the transparency of the lower atmospheric stratum.

AD-610 914 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
STRUCTURAL DIAGRAM OF ANTARCTICA,
by P. S. Voronov. Apr 59, 6p T-322-R
TT 59-15543

Unclassified report

Trans. of Sovetskaya Antarkticheskaya Ekspeditsiya. Informatsionnyi Byulleten' (USSR) 1958, p. 21-25.

Descriptors: (*Structural geology, Polar regions), (*Polar regions, Structural geology), (*Maps, Structural geology), Geological survey, Folds (Geology), Faults (Geology), Rock (Geology), USSR.

A discussion is presented on the geological structure of the Antarctic, and a structural diagram is given showing the post Proterozoic platforms, zones of Caledonomiau, Hercyniau, and Alpine folding, the sima region of the Pacific Ocean, the strike of the principal folds and Cenozoic faults, Alpine frontal down-warps, Cenozoic block-structures, oceanic depressions deeper than 4000 m, epicenters of recent earthquakes, and Cenozoic volcanoes.

AD-610 915 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
SCHEME OF GENERAL CIRCULATION OF THE PACIFIC OCEAN WATERS,
by A. M. Muromtsev. Jul 59, 9p T-323-R
TT 59-22136

Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Geograficheskaya, 1958, no. 4, p. 24-32.
Also available from NRC mi$0.50, ph$1.50 as C-3139.

Descriptors: (*Pacific Ocean, Ocean currents), (*Ocean currents, Pacific Ocean), Temperature, Salinity, Wind, Oceanographic data, Maps, USSR.

The general circulatory scheme of the Pacific Ocean waters indicates that the principal source of water supply to this ocean is located in the high southerly latitudes. From here the water is propagated at all depths over the southern regions and passes, by way of the deep currents and bottom currents, into the northern part of the ocean, and thence into the Okhotsk and Bering Seas. In these seas the deep waters, like the overlying intermediate and subsurface waters, are gradually transformed; they rise in cyclonic eddies to the surface and turn back toward the ocean in the form of surface waters, feeding the northern part of the ocean. In the convergence zones these waters descend into the deep strata and are carried by the upper deep current to the south, where the general eastern transport takes them out into the Atlantic Ocean. Thus likewise it is in the high southerly latitudes that the general circulation of the Pacific Ocean waters is completed.

AD-610 917 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
AN EXPERIMENTAL RESEARCH ON THE STATISTICAL CHARACTERISTICS OF SCINTILLATION OF A LIGHT-SOURCE AT GROUND LEVEL,
by A. S. Gurvich, V. I. Tatarskii, and L. P. Tsvang. Oct 59, 7p T-326-R
TT 60 12957

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1958, v. 123, no. 4, p. 655-658.
Also available from NRC as C-3272.

Descriptors: (*Stars, Light transmission), Refractive index, Light, Atmosphere, Turbulence, Intensity, Integral transforms, Statistical functions, Probability, Theory, Optics, Astrophysics, USSR.

The phenomenon of scintillation (twinkling) and shimmering of stars, or of other sources of radiation both outside the limits of the terrestrial atmosphere and inside it, was considered in connection with problems of observational astronomy and certain problems of radiometeorology. A detailed theory of these phenomena was worked out, based on concepts of the theory of local-isotropic turbulence.

AD-610 918 Div. 2, 30
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
NEW MODELS OF OCEANOGRAPHIC APPARATUS,
by E. I. Chaplygin. Jul 59, 5p T-327-R
TT 59-22134

Unclassified report

Trans. of Problemy Arktiki (USSR) 1958, no. 3, p. 106-108.
Also available from NRC mi$0.50, ph$1.50 as C-3131.

Descriptors: (*Oceanographic equipment, Design), (*Ice, Measurement), Tests, Thickness, USSR.

The design and operating procedures of two oceanographic instruments are described. The instruments are a modernized light-weight bathometer and an ice-measuring line used for determining the thickness of ice through a manually bored hole.

AD-610 919 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE DIURNAL PERIODICITY OF AURORA WITHIN THE MAXIMUM-FREQUENCY ZONE,
by S. I. Isaev. Aug 60, 7p T-330-R
TT 65-61645

Unclassified report

Trans. of Problemy Arktiki (USSR) 1940, no. 9, p. 41-45.

Descriptors: (*Aurorae, Diurnal variations), Periodic variations, Terrestrial magnetism, Magnetic storms, Arctic regions, USSR.

Three types of auroral diurnal variations are defined. The first and most simple type, having a single night maximum, is observed in the outer zone, that is, up to about 70 degrees of geomagnetic latitude. The second and more complicated type, exhibiting a secondary morning maximum, prevails in the region between 70 and 78 degrees of geomagnetic latitude, that is, in the transitional zone of magnetic disturbance. The third type, with an unstable or indeterminate diurnal variation, is observed beyond 78 degrees of geomagnetic latitude, that is, in the inner zone of magnetic disturbance. The boundaries between these zones, it seems, do not run strictly according to geomagnetic latitude but have a somewhat oval form.

AD-610 920 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
GEOMAGNETIC PROBLEMS AND THE INTERNAL STRUCTURE OF THE EARTH,
by V. A. Uspenskii. Sep 59, 4p T-331-R
TT 59-22217

Unclassified report

Trans. of Akademiya Nauk SSSR. Geofizicheskii Institut. Trudy, 1955, no. 26(153) p. 208-210.
Also available from NRC as C-3203.

Descriptors: (*Terrestrial magnetism, Mapping), (*Earth, Structural geology), Magnetic fields, Magnetic moments, Geophysics, Theory, Earth models, USSR.

Some of the problems of geomagnetic secular variation are briefly considered.

AD-610 921 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
BOTTOM TOPOGRAPHY OF THE GREENLAND SEA IN THE REGION OF NANSEN'S SILL,
by A. F. Laktinov. Nov 59, 6p T-333-R
TT 60-10893

Unclassified report

Trans. of Priroda (USSR) 1959, v. 48, no. 10, p. 95-97.

Descriptors: (*Greenland Sea, Ocean bottom topography), (*Ocean bottom topography, Greenland Sea), Hydrographic surveying, Oceanographic vessels, Arctic Ocean, Atlantic Ocean, Heat transfer, USSR.

In 1955-1956 a complex of oceanographic researches were carried out in the northern part of the Greenland Sea and in the Central Arctic areas adjacent thereto. These expeditions endeavored to study in detail the bottom topography in the Nansen Sill area, and to determine the exchange of water and heat between the North Atlantic and the Arctic Basin. Several hydrological cross-sections and depth traverses were made. It was established that there does not exist any such continuous 'Nansen's Sill' as has been hitherto charted. The sill is cut through, almost at its middle, by a deep-water trough (saddle), the axis of which extends in a north-south direction along the meridian of 1 degree W. The depths in the center of this trough are as much as 3500 to 3900 m in the southern part and 3100 to 3400 m in the northern part. Farther to the north the trough merges into the deep-water depression of the Atlantic side of the Arctic Basin. Hydrological, geological and hydrochemical data also confirm the existence of the trough.

AD-610 922 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
RE THE INFLUENCE OF GEOMAGNETIC DISTURBANCE ON GEOMAGNETIC ELECTROKINETOGRAPH CURRENT-MEASUREMENTS IN THE BARENTS SEA,
by A. A. Lebedev. Dec 59, 9p T-335-R
TT 60-12955

Unclassified report

Trans. of Gosudarstvennyi Okeanograficheskii Institut. Trudy (USSR) 1957, v. 40, p. 50-56.
Also available from NRC as C-3276.

Descriptors: (*GEK data, Magnetic storms), (*Magnetic storms, GEK data), Terrestrial magnetism, Polar regions, Ocean currents, Measurement, Aurorae, USSR.

This study concluded that during a period of geomagnetic disturbance the GEK records a summation of the potential-differences due to the sea currents plus the magnetic storm. The effect of geomagnetic disturbance on the GEK current-record manifests itself as an increase of the registered current-velocities as compared with the indications of the current-meter, and this effect is dependent on the magnetic storm intensity. Since in the auroral zone the maximum of geomagnetic disturbance is observed to occur at night, current measurements with the GEK should be made in the daytime. In years of maximum magnetic activity, current-measurements with the GEK will become more difficult.

AD-610 923 Div. 2, 30
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
TIDE-GAUGE INSTALLATION ON SHORE-ICE, EMPLOYING (AUXILIARY) WATER-LEVEL GAUGE,
by N. P. Iretskii. Mar 60, 3p T-336-R
TT 60-12977

Unclassified report

Trans. of Problemy Arktiki (USSR) 1959, no. 6, p. 117-119.
Also available from NRC as C-3293.

Descriptors: (*Tides, Meters), (*Meters, Tides), Liquid-level gages, Ice, Polar regions, Measurement.

In the suggested scheme, a 'water-level gauge' is mounted on the metal tube which is to be frozen into the ice. The slightest change in the immersion-depth of the ice will cause a change in the level of the liquid in the water-level gauge, which will give warning that the zero point of the tide-gauge has been displaced and will show the amount of this displacement. This simple device, easy to construct under polar station conditions, makes it possible to carry out lengthy series of observations on the fluctuation of sea-level with the least expenditure of labor and material.

AD-610 925 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ANNUAL WATER BALANCE OF THE ARCTIC OCEAN,
by V. T. Timofeev. Mar 60, 4p T-338-R
TT 60-12978

Unclassified report

Trans. of Priroda (USSR) 1956, v. 45, no. 7, p. 89-91. Also available from NRC as C-3303, 3p.

Descriptors: (*Arctic Ocean, Oscillation), (*Sea water, Volume), Atlantic Ocean, Pacific Ocean, Ocean currents, Oceanology, Statistical data, Transport properties, USSR, Hydrology.

Statistical data are presented on the influx and efflux of sea water for the Arctic Ocean. The hydrology of adjacent sources of water is taken into account.

AD-610 926 Div. 2, 12
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
DETECTION OF CORPUSCLES BY THE THIRD SPUTNIK,
by V. I. Krasovskii, Yu. M. Kushnir, G. A. Bordovskii, G. F. Zakharov, and E. M. Svetlitskii.
Jun 60, 3p T-340-R
TT 60-25438

Unclassified report

Trans. of Iskusstvennye Sputniki Zemli (USSR) 1958, v. 2, p. 59-60.
Also available from NRC mi$0.50, ph$1.50 as C-3414, 2p.

Descriptors: (*Solar radiation, Upper atmosphere), Measurement, Satellites (Artificial), Electrons, Acceleration, Polar regions, Ionization, Terrestrial magnetism, USSR.

Preliminary analysis indicates that the observed intense signals might be accounted for in terms of an acceleration of the electrons of the exterior atmosphere (in an electrically conducting circuit formed along the magnetic lines of force and closed in the terrestrial ionosphere) by the action of variable magnetic fields 'frozen' into the solar corpuscular streams. If so, the harder electrons would be precipitated upon the polar regions, since the circuit connecting with the polar regions has the maximum area. The daytime augmentation of the electron fluxes could be explained by increased ionization at the boundary of the exosphere, the result of which would be a greater quantity of ionized particles coming into the outer atmosphere, or by the action of geomagnetic p sub c pulsations, which are more intense in the daytime. Upon reaching a certain velocity, the electrons could execute oscillatory motions along the curving magnetic lines.

AD-610 928 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
MAGNETIC VARIATION INSIDE THE PRINCIPAL AURORAL ZONE,
by Ya. I. Fel'dshtein and E. I. Kurdina. Sep 60, 3p
T-342-R
TT 61-12600

Unclassified report

Trans. of Problemy Arktiki i Artarktiki (USSR) 1960, no. 3, p. 118-119. Also available from NRC mi$0.50, ph$1.50 as C-3467, 2p.

Descriptors: (*Terrestrial magnetism, Franz Josef Land), Aurorae, Arctic regions, Magnetic properties, Measurement, Instrumentation, Geophysics, USSR.

Research on the distance-variability of the magnetic field components within the auroral zone was conducted with a Briunelli magnetic variation recorder at Nagurskaya Bay (Franz Josef Land). The magnetic field variation was recorded on film, continuously from the 13th of April to the 6th of May and was compared with the magnetograms of the Tikhaya Bay magnetic observatory, a distance of 108 km from Nagurskaya. For a quantitative comparison of the mobile recorder traces and the magnetograms of the constantly operating observatory, momentary values of the departures of H and Z from the quiet field were used at moments when the field assumed characteristic extreme (maximum or minimum) values. These extremes were taken in sequence, just as they occurred in the mobile recorder data, and practically all of them coincided in time with the extremes at Tikhaya Bay. From the corresponding pairs of departures from the quiet field values the calculated correlation coefficients are given in tabular form. The able also shows the ratios of the correlation coefficients to the dispersion; these ratios are an indication of the reliability of the computed correlation coefficients.

AD-610 930 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE DICKSON ISLAND AND CAPE CHELYUSKIN Q-INDICES OF MAGNETIC ACTIVITY,
by Ya. I. Fel'dshtein. Jan 61, 15p T-347-R
TT 61-12914

Unclassified report

Partial trans. of mono. Vozmushcheniya Elektomagnitnogo Polya Zemli (Disturbances of the Terrestrial Electromagnetic Field) Moscow, 1960.
Also available from NRC mi$0.50, ph$3.00 as C-3565.

Descriptors: (*Terrestrial magnetism, Arctic regions), Atmospheric sounding, Aurorae, Radio waves, Electromagnetic wave reflections, Geophysics, USSR.

During the IGY, vertical ionospheric soundings, radio-wave absorption studies and auroral radio reflection studies were conducted at 15-minute intervals. For comparison of the ionospheric parameters and auroral data with magnetic activity, the quarter-hourly Q-index was introduced into the routine of the high-latitude magnetic observatories, as proposed by J. Bartels (Geomagnetism, 1956, no. 1). This index describes the geomagnetic activity during 15-minute intervals centered at 0, 15, 30 and 45 minutes of each hour. In deriving the Q-index, only the variations of the horizontal elements of the geomagnetic field are used, namely, the declination D and the horizontal component H. The subject of the present paper is the study of the behavior of the new

index of magnetic activity and the comparison of the results obtained with those of the old indices hitherto employed. Materials for the research were the Dickson Island and Cape Cheliuskin magnetograms recorded during the period from July 1956 to July 1957.

AD-610 933 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
NEW EXPLORATIONS OF THE BOTTOM TOPOGRAPHY IN THE GREENLAND SEA,
by P. Volkov. Jul 61, 9p T-356-R
TT 61-25687

Unclassified report

Trans. of Morskoi Flot (USSR) 1961, v. 21, no. 3, p. 35-37.
Also available from NRC as C-3760.

Descriptors: (*Greenland Sea, Ocean bottom topography), (*Ocean bottom topography, Exploration), Arctic Ocean, Atlantic Ocean, Oceanographic data, Hydrodynamics, Temperature, Transport properties, Navigation, USSR.

A detailed description is given of the ocean bottom topography of the Greenland Sea. An attempt was made to correct previous erroneous data.

AD-610 934 Div. 2, 30
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE ANCHOR DRIFTOGRAPH,
by N. N. Sysoev. Jan 62, 6p T-364-R
TT 62-12844

Unclassified report

Trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, 1951, v. 5, p. 46-49.
Also available from NRC as C-3898.

Descriptors: (*Oceanographic equipment, Anchors (Marine)), (*Ocean currents, Measurement), Recording systems, Drift, Cyclindrical bodies, Ocean bottom, Oceanology, USSR.

It was proposed to construct, and introduce into practical anchor station work, a driftograph, based on the principle of making allowance for drift by recording the movements of a heavy pin-studded cylinder over the sea floor. The driftograph has a recording mechanism, which during operations is enclosed in a hermetically sealed thick-walled steel cylinder. The latter is mounted inside a cylindrical watertight housing, fitted with pins to secure better gripping of the bottom. The housing is hollow, and has on its ends the half-axles, turning in the rings of the side-rods when the roller is in motion. Between the side-rods, which are joined by the cross-tie bolt, there is mounted a triangular flat hull, made of thin sheet iron. The purpose of this hull is to keep the driftograph from burying itself in the sea-floor when it is being pulled around, and to make it easier for the driftograph to surmount sea-floor obstacles.

AD-610 935 Div. 2, 4
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
STANDARDIZATION OF METHODS OF CHEMICAL RESEARCH AND METHODS OF EXPRESSING SEA-WATER ANALYSES,
by S. V. Bruevich. Mar 62, 6p T-367-R
TT 62-17238

Unclassified report

Trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, 1958, v. 26, p. 243-246. Also available from NRC as C-3942.

Descriptors: (*Sea water, Chemical analysis), Standards, Quantitative analysis, Colorimetry, USSR, Standardization.

A series of recommended procedures are given for the analysis of the following parameters of sea water: chlorinity, pH, alkalinity, dissolved oxygen, H_2S, phosphates, silicic acid, nitrates, ammonia, and oxidizability in neutral medium. The standard quantitative methods of expressing analytical results recommended by the General Assembly of the Association of Physical Oceanography in 1939 are listed, and new methods of expressing these and other quantities are proposed.

AD-610 936 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
EXPERIENCE IN WORKING WITH IMPACT CORE-SAMPLERS,
by P. L. Bezrukov and V. P. Petelin. Sep 62, 4p T-370-R
TT 63-12540

Unclassified report

Trans. of Akademiya Nauk SSSR. Institut Okeanologii. Trudy, 1951, v. 5, p. 14-16.
Also available from NRC as C-4169, 3p.

Descriptors: (*Samplers, Oceanographic equipment), (*Oceanographic equipment, Samplers), Ocean bottom sampling, Well logging, Pneumatic devices, Hydraulic systems, Design, Operation, USSR.

Impact core-samplers used in Soviet oceanographic expeditions to obtain longer cores of ocean-bottom sediments are discussed. The use of the hydraulic core-expeller of Kudinov's design (TT 63-12541) is claimed to have brought the utmost simplicity into the process of extracting the cores from the tubes, and to have improved the quality of the lithological material obtained.

AD-610 937 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE APPLICATION OF AVIATION METHODS IN EXPLORING THE HIGH-LATITUDE REGIONS OF PRESENT-DAY GLACIATION,
by V. D. Dibner. May 62, 9p T-371-R
TT 62-34399

Unclassified report

Trans. of Vsesoyuznoe Geograficheskoe Obshchestvo. Izvestiya (USSR) 1962, v. 94, no. 1, p. 61-65.
Also available from NRC as C-4055.

Descriptors: (*Glaciers, Aerial photography), (*Franz Joseph Land, Terrain), Islands, Geological survey, Beaches, Structural geology, Mapping, USSR.

Aerological and glacio-geomorphological observations on Franz Joseph Land are presented.

AD-610 938 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE FACE OF NATURE IN RECENT GEOLOGICAL TIME,
by K. K. Markov. Jul 63, 15p T-391-R
TT 63-22459

Unclassified report

Trans. of Priroda (USSR) 1962, v. 51, no. 12, p. 26-33.
Also available from NRC as C-4502, 7p.

Descriptors: (*Geological survey, Earth), (*Earth, Geological survey), History, Terrain, Ocean bottom, Oceans, Mountains, Glaciers, Climatology, Paleontology, Geologic age determination, USSR.

Changes in natural conditions which took place during the Quaternary Period and their effects on the countenance of the earth are discussed. The tectonic development of the planet is also considered in terms of its climatological effects.

AD-610 940 Div. 2, 5
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
GEOGRAPHIC DISTRIBUTION OF IONOSPHERIC DISTURBANCE IN THE F2 LAYER,
by E. V. Lavrova. Apr 63, 15p T-384-R
TT 63-17536

Unclassified report

Trans. of Akademiya Nauk SSSR. Institut Zemnogo Magnetizma Ionosfery Rasprostraneniya Radiovoln. Trudy, 1961, no. 19(29) p. 31-43.
Also available from NRC as C-4393.

Descriptors: (*Ionospheric disturbances, Graphics), Magnetic storms, Radiofrequency interference, Distribution, Ionosphere, Geography, Maps.

An analysis was made of ionospheric disturbance synoptic charts and of longitudinal distribution graphs of the percentage departures of the critical frequency. It was concluded that: For a day or two before the commencement of a magnetic storm the departure curves in the mean lie above the zero level. At the commencement of a magnetic storm the negative departures increase, reaching 80%, with the maximum negative departures mainly associated with longitudes 180 deg W - 70 deg E. During an active storm period the negative departures extend to all longitudes, and are as much as 60-80%. The maximum negative departures are at longitudes 180 deg W - 70 deg E. During this period total absorption is observed at longitudes 80-140 deg W. Such distribution, it seems, may be explained by dependence of delta f sub oF2 on geomagnetic latitude. At the end of a magnetic storm the curves are observed to rise toward zero level. Consideration was given to how these conclusions could possibly be applied in the practical work of short-term forecasting of radio conditions.

AD-610 941 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
SECULAR FLUCTUATIONS OF THE CONTINENTALITY OF THE CLIMATE AT MOSCOW,
by L. V. Klimenko. Oct 63, 3p T-395-R
TT 64-12234

Unclassified report

Trans. of Vsesoyuznoe Geograficheskoe Obshchestvo. Izvestiya (USSR) 1963, v. 95, no. 4, p. 367-368.
Also available from NRC as NRC-C-4601.

Descriptors: (*Climatology, USSR), Meteorological parameters, Periodic variations.

The yearly amplitude of the temperature at Moscow (July to January) was calculated for 140 years, starting from 1821, since from that year on there have been no gaps in the published data for the mean monthly temperature at Moscow. The integral curve of yearly amplitudes constructed from these data (by summing the departures from the long-term means) shows that the variations of continentality fall into four well-expressed periods, mainly reflecting fluctuations in the January temperature: (1) From the end of the 1820's to the beginning of the 1860's, a period when there prevailed stable high indices of continentality, due to a low January temperatures; (2) from the beginning of the 1860's to the end of the 1890's the continentality was subject to brief fluctuations in either direction, with a slight falling trend; (3) from the end of the 1890's to the middle of the 1920's there was observed a period of markedly declining continentality, due to just as marked a rise of the January temperature, and also a quite considerable fall of July temperature; and (4) from the middle of the 1920's until 1960 the continentality underwent fluctuations in either direction, with a slight rising trend.

AD-610 944 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania State Univ., University Park. Dept. of Geology and Geophysics.
COOPERATION IN SEISMIC MEASUREMENTS OF CRUSTAL STRUCTURE IN MINNESOTA.
Final progress rept. for 15 Apr 63-15 Oct 64,
by B. F. Howell, Jr. 15 Oct 64, 9p
Contract Nonr166100; Grant NSF GP1119

Unclassified report

Descriptors: (*Seismology, Minnesota), (*Minnesota, Seismology), Underwater explosions, Lakes, Seismic waves, Propagation, Velocity, Measurement, Seismographs, Lithosphere, Structural geology.

Eighty-two one-ton charges of dynamite were detonated under controlled conditions at pre-selected points in Lake Superior. A network of seismic crews recorded the vibrations produced by these explosions. The frequency spectra are in many ways similar to those found for the Gulf of Maine by Nakamura and Howell (BULL. SEIS. SOC. AM. 54:9-18, 1964). There are frequent minima in the spectrum presumably due to interference (Nakamura, BULL. SEIS SOC. AM 54:1-8, 1964). These holes display no so-far-identified pattern. Unlike the Maine records, the Minnesota records do not show a strong difference in the spectrum between the direct and critically refracted pulse. This could mean that the Mohorovicic discontinuity in Minnesota is sharper than in Maine.

AD-610 949 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Hawaii Inst. of Geophysics, Honolulu.
SOME SELECTED STUDIES OF THE ATMOSPHERIC BOUNDARY LAYER.
Final rept. for 1 Nov 60-31 Aug 64,
by Wan-Cheng Chiu and Mariano A. Estoque.
Sep 64, 36p HIG-64-19
Contract AF19 604 7484, Proj. 7655, Task 765501
AFCRL 64-887

Unclassified report

See also AD-416 295.

Descriptors: (*Atmosphere, Boundary layer), Micrometeorology, Sea breeze, Wind, Atmospheric temperature, Humidity, Heat transfer, Mathematical models, Geophysics.

In the lowest layers of the atmosphere, the wind, temperature, and moisture fields are greatly influenced by the characteristics of the underlying earth's surface. Attempts were made to develop certain types of numerical models of the lowest layers of the atmosphere. The results of the studies of the sea breeze phenomenon, the wind and temperature fields, and the upward flux of heat with these models are summarized in this report. (Author)

AD-610 954 Div. 2, 6, 8
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
TRANSMISSION OF MICROPULSATIONS THROUGH THE LOWER IONOSPHERE.
Memo. rept.,
by Carl Greifinger and Phyllis Greifinger. Feb 65, 47p RM-4388

Unclassified report

Descriptors: (*Ionospheric disturbances, Explosion effects), (*Explosion effects, Ionospheric propagation), (*Detection, Nuclear explosions), (*Nuclear explosions, Detection), High altitude, Terrestrial magnetism, Oscillation, Hydrodynamics, Magnetic fields, Propagation, Mathematical models, Low frequency, Electromagnetic waves.

This report is part of RAND's continuing interest in the detection of high-altitude nuclear explosions. In particular, it is concerned with the low-frequency hydromagnetic waves which are generated by such explosions, and which are detected by ground-current measurements at world-wide locations. Attention is directed to the response of the ionosphere to such low-frequency hydromagnetic disturbances. The purpose is to separate the effects of the medium from those of the source on the transmitted disturbance.

AD-610 958 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ON THE HIGH-LATITUDE GEOGRAPHIC DISTRIBUTION OF ANOMALOUS ABSORPTION OF RADIO WAVES IN THE IONOSPHERE AND RE THE GEOGRAPHIC DISTRIBUTION OF MAGNETIC ACTIVITY IN THE ANTARCTIC,
by A. P. Nikol'skii. May 57, 14p T-244-R
TT 65 61656

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1957, v. 112, no. 4, p. 628-631; no. 5, p. 846-848.

Descriptors: (*Ionosphere, Absorption), (*Terrestrial magnetism, Polar regions), Radio waves, Periodic variations, Distribution, USSR.

AD-610 961 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE COAGULATION OF CHARGED CLOUD-DROPLETS AND SIZE DISTRIBUTION FUNCTION FOR CLOUD-DROPLETS AND RAINDROPS,
by L. M. Levin. Mar 58, 12p T-263-R
TT 65 61659

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady 1954, v. 94, no. 3, p. 467-470; no. 6, p. 1045-1048.
Also available from NRC as C-2618.

Descriptors: (*Raindrops, Coagulation), (*Drops, Particle size), (*Clouds, Drops), Atmospheric electricity, Electrostatics, Statistical functions, Aerosols, USSR.

AD-610 962 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ICE-DRIFT AND ITS CALCULATION (RECENT RUSSIAN PAPERS),
by A. I. Fel'zenbaum, D. A. Drogaitsev, I. V. Maksimov, and V. L. Lebedev. Oct 57, 23p T-264-R
TT 65-61660

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1956, v. 108, no. 5, p. 799-801; 1957, v. 113, no. 2, p. 307-310; Akademiya Nauk SSSR. Izvestiya. Seriya Geofizicheskaya, 1956, no. 11, p. 1332-1337; excerpts from mono. Antarktika, Moscow, 1957, p. 77-78.
Also available from NRC as C-2506 and C-2498.

Descriptors: (*Ice, Drift), (*Arctic Ocean, Ice), (*Tides, Polar regions), Oceanology, Wind, Compressive properties, Hydrodynamics, Mathematical analysis, Barometric pressure, USSR.

Contents:
Theoretical principles of calculating ice-drift in the Central Arctic basin, by A. I. Fel'zenbaum
Zones of compression and rarefaction of ice in the atmospheric pressure field, by D. A. Drogaicev
The 'polar tide' in the world ocean, by I. V. Maksimov
Excerpt from 'Antarktika', by V. L. Lebedev, on the downward drift of iceberg fragments.

AD-610 965 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ON THE THORY OF THE DAYTIME SKY BRIGHTNESS UNDER CONDITIONS OF A SPHERICAL EARTH,
by V. G. Fesenkov. Apr 58, 19p T-279-R
TT 65-61663

Unclassified report

Trans. of Astronomicheskii Zhurnal (USSR) 1955, v. 32, no. 3, p. 265-281.

Descriptors: (*Sky brightness, Theory), Earth, Atmosphere, Troposphere, Stratosphere, Light, Scattering, Atmospheric refraction, Refractive index, Solar radiation, Optics, Twilight, Integrals, USSR.

Existing theories of daytime sky brightness hold only for the flat earth case, and thus are inapplicable near the horizon; they cannot be generalized to deal with twilight. Yet when the sun is low over the horizon the atmosphere is virtually in the twilight state even during the daytime, since its lowest layers are acting only to decrease the sky brightness by their absorption of light. This report gives a more general theory of sky brightness developed for the case of a spherical earth; it was been found to be in good agreement with observations when the atmosphere is in a stable state. The theory is also generalized

to cover the case of an observer at different altitudes above the surface of the earth. The density of the atmosphere is assumed to vary according to an exponential law. The index of light scattering is taken as invariable throughout the whole thickness of the atmosphere. Only scattering of the first order is considered. The compilation of auxiliary tables of atmospheric masses along the observer's line of sight, and along the solar rays illuminating any given volume of the atmosphere, permits the sky brightness to be evaluated at any point above or below the astronomical horizon. (Author)

AD-610 966 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ATMOSPHERIC PROCESSES IN THE CENTRAL ARCTIC,
by S. S. Gaigerov. Mar 58, 15p T-282-R
TT 65-61664

Unclassified report

Trans. of Priroda (USSR) 1957, v. 46, no. 12, p. 27-34.

Descriptors: (*Air mass analysis, Arctic regions), (*Arctic regions, Air mass analysis), (*Atmospheric motion, Arctic regions), Weather forecasting, Meteorological charts, Weather stations, Ice islands, Atmospheric sounding, USSR.

The results of systematic aerological observations conducted from the Russian drifting ice station, North Pole 4, from April 1955 through April 1956, are presented. The observations were primarily concerned with movements and evolution of cyclones, anticyclones, and fronts.

AD-610 968 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
REFRACTION OF EXTRATERRESTRIAL RADIO-WAVES IN THE ATMOSPHERE,
by N. A. Belyaev. Apr 58, 20p T-285-R
TT 65 61647

Unclassified report

Trans. of Astronomicheskii Zhurnal (USSR) 1955, v. 32, no. 4, p. 359-372.

Descriptors: (*Atmospheric refraction, Extraterrestrial radio waves), (*Extraterrestrial radio waves, Atmospheric refraction), Ionosphere, Radio astronomy, Refractive index, Theory, Integrals, Equations, USSR.

Theoretical principles, formulae and examples are given for calculating the refraction of extraterrestrial radiowaves in the atmosphere for purposes of radio astronomy. The problem of extraterrestrial radiowave refraction is considered for the case of a quiet undisturbed ionosphere. (Author)

AD-610 972 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
RETREAT OF THE NOVAYA ZEMLIA GLACIERS,
by P. A. Kaplin. May 58, 6p T-293-R
TT 65 61650

Unclassified report

Trans. of Priroda (USSR) 1958, v. 47, no. 3, p. 88-90.
Also available from NRC as C-2690, 6p.

Descriptors: (*Glaciers, Melting), (*Arctic regions, Glaciers), Islands, Seacoast, Configuration, Physical properties, USSR.

A comparison was made of charts compiled from surveys of 1933 and 1952. The charts delineated the physical characteristics of the glacier and its surrounding area. A general description of the retreat is included.

AD-610 975 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
POSSIBILITY OF ABSORPTION OF SOLAR LYMAN ALPHA RADIATION BY THE INTERPLANETARY MEDIUM,
by G. M. Nikol'ski. Nov 58, 4p T-309-R
TT 59 10198

Unclassified report

Trans. of Astronomicheskii Zhurnal (USSR) 1958, v. 35, no. 4, p. 657-659.

Descriptors: (*Solar radiation, Absorption), (*Line spectrum, Solar radiation), Hydrogen, Ionization, Absorption spectrum, Ultraviolet radiation, USSR.

For $n_e \sim 10^2$ to 10^3 cm^{-3} and $T \sim 10^4$ degrees the concentration of neutral hydrogen in interplanetary space ($r \gtrsim 1$ AU) is $n_H \sim 1$ to 10 cm^{-3}. The optical thickness of the interplanetary gas in the L_a line between the earth and the sun is great. A reversal of width 0.1 Å approximately should develop in the center of L_a. (Author)

AD-610 976 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
TECTONOPHYSICS: A PROMISING NEW ORIENTATION IN GEOLOGY,
by V. V. Belousov. Nov 58, 11p T-310-R
TT 59-15264

Unclassified report

Trans. of Akademiya Nauk SSSR, Vestnik, 1958, v. 28, no. 9, p. 3-10.
Also available from NRC as C-2995.

Descriptors: (*Structural geology, Earth), History, Terrain, Mountains, Minerals, Rock (Geology), Folds (Geology), Reviews, USSR.

Tectonophysics is defined as the study, by simultaneous use of geological and physical methods, of the mechanism of tectonic deformations developing in the earth's crust.

AD-610 977 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE MODELING METHOD IN TECTONOPHYSICS,
by M. V. Gzovskii. Mar 59, 30p T-311-R
TT 59-18614

Unclassified report

Trans. of Sovetskaya Geologiya (USSR) 1958, v. 1, no. 4, p. 53-72.
Also available from NRC as TT-806, 16p.

Descriptors: (*Structural geology, Earth), (*Folds (Geology), Models (Simulations)), (*Rock (Geology), Mechanical properties), Model tests, History, USSR.

The properties which models for simulating natural geological structures should have, can be defined by the theory of physical similitude and by available information regarding the mechanical properties of rocks. By means of tests with models, laws and supplementary facts have been established which in natural geological structures it would be either highly laborious or impossible to detect. This applies primarily to the study of structural details of the earth's crust down to great depths, to tracing the history of the development of deformations and faults throughout very long periods of time, to studying the stressed state of the crust, and to determining the physical conditions for the occurence of deformations and faults of definite types. Consequently, modeling is a technique capable of advancing the solution of various geological and geophysical problems.

AD-610 979 Div. 2, 12, 30
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
PHOTON RESEARCH CONDUCTED BY MEANS OF THE THIRD ARTIFICIAL EARTH-SATELLITE,
by A. E. Chudakov. Feb 59, 5p T-316-R
TT 59-15280; TT 61-17584

Unclassified report

Trans. of Priroda (USSR) 1958, v. 47, no. 12, p. 88-90.

Descriptors: (*Radiation measurement systems, Satellites (Artificial)), (*Photons, Radiation measurement systems), Upper atmosphere, Luminescence, Telemeter systems, Ionization, Gamma rays, USSR.

A description is given of the luminescence counter used to obtain data on photons at high altitudes and of the method used in transmitting the data. A high-count region was found above 60 degrees N which impeded the detection of weak gamma radiation from the sun. An increased sensitivity of instrumentation is necessary.

AD-610 980 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
MAGNETIC VARIATIONS IN THE REGION OF THE AURORAL ZONE,
by Ya. I. Fel'dshtein and E. I. Kurdina. Feb 59, 13p T-318-R
TT 65 61654

Unclassified report

Trans. of Problemy Arktiki (USSR) 1958, no. 3, p. 53-59.

Descriptors: (*Terrestrial magnetism, Arctic regions), Aurorae, Magnetic properties, Magnetic fields, Statistical analysis, Statistical functions, USSR.

H, D, and Z components were recorded at the Dickson Island station and at various distances from the observatory. The magnetic field variations had the same general character at distances of 180 km in latitude and 300 in longitude as at the observatory. Closeness of correlation at other points was markedly dependent on the bearing, although at about 10 km no changes in the character of the variations were observed. At 800 km the Z variations were frequently in opposite phase.

AD-610 981 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
UNUSUAL LOCALIZED CHARACTER OF MAGNETIC VARIATION IN THE MIRNY REGION,
by P. K. Sen'ko. Mar 59, 3p T-319-R
TT 59-15220

Unclassified report

Trans. of Sovetskaya Anarkticheskaya Ekspeditsiya. Informatsionnyi Byulleten' (USSR) 1958, no. 1, p. 81-82.

Descriptors: (*Terrestrial magnetism, Arctic regions), Magnetic fields, Oscillation, Measurement, Magnetometers, Geophysics, USSR.

Collation of the magnetic fluctuations (D, H and Z separately) at the magnetic hut and at the inland observation-point (10 km from the hut) yielded the following results: (1) The D, H and Z fluctuations inland and at the magnetic hut were identical in character, but the Z curve at the inland point is somewhat smoothed; (2) the amplitudes of the H fluctuations at the inland point were for the most part larger than at the hut, with differences amounting to 0 - 50% of the size of the fluctuations. But often (in 25% of all collated cases) the amplitudes at the inland point were smaller than at the hut by 0 - 20%; (3) likewise the amplitudes of the D fluctuations at the inland point were for the most part larger than at the hut by as much as 20%, but often, as in the case of the H amplitudes, the opposite relationship was observed; and (4) the amplitudes of the Z fluctuations on the continent were in the overwhelming majority of cases (36 cases out of 40) larger by 10 - 60% than at the hut.

AD-610 983 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
RE CERTAIN LAWS OF MAGNETIC DISTURBANCE IN THE HIGH LATITUDES,
by O. A. Burdo. Apr 59, 16p T-321-R
TT 60-10107

Unclassified report

Trans. of mono. Fizika Solnechnykh Korpuskulyarnykh Potokov i Ikh Vozdeistvie na Verkhnyuyu Atmosferu Zemli, Moscow, 1957, p. 159-166, 174-177. (Conference Committee on Solar Research, 22 Nov 55. Transactions.)
Also available from NRC as C-3167.

Descriptors: (*Ionospheric disturbances, Magnetic storms), (*Magnetic storms, Ionospheric disturbances), Arctic regions, Upper atmosphere, Solar radiation, Magnetic properties, Diurnal variations, USSR.

In the high latitudes, there are no persistent magnetic storm phenomena of any importance that are unrelated to the irregular fluctuations. In each individual case of magnetic disturbance, there develops a system of superficial horizontal currents extending over the whole polar cap and similar in form to the mean current system. There are three spiral bands in which the current density exhibits maximum values. The dynamo effect in the ionosphere seems the most likely cause of the magnetic disturbances. The dynamo theory provides a natural and simple explanation for the principal observed laws. (Author)

AD-610 984 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
CONTRIBUTION TO THE STUDY OF THE LEADING CHARACTERISTICS OF GEOMAGNETIC STORMS WITH SUDDEN COMMENCEMENTS,
by G. P. Berishvili. Nov 59, 17p T-332-R
TT 60-14027

Unclassified report

Trans. of Akademiya Nauk SSSR. Geofizicheskii Institut. Trudy, 1957, no. 16(143), p. 39-51.

Descriptors: (*Magnetic storms, Periodic variations), (*Terrestrial magnetism, Magnetic storms), (*Solar wind, Magnetic storms), Solar radiation, Elementary particles, USSR.

Sudden commencement data are compiled for the declination, vertical, and horizontal components of change in the geomagnetic field, and these data are considered from the aspect of daily, annual, secular, and geographic variations.

AD-610 985 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
METEOROLOGY AND SEISMOLOGY IN CHINA,
by Chao Chuchang. Dec 59, 13p T-334-R
TT 60-12951

Unclassified report

Trans. of Priroda (USSR) 1959, v. 48, no. 10, p. 27-34.
Also available from NRC as C-3285.

Descriptors: (*Meteorology, China), (*Seismology, China), Weather forecasting, Periodic variations, Climatology, Atmospheric motion, Seismological stations, USSR.

A review is given of research in the fields of meteorology (with special attention to studies on the influence of the Tibetan plateau on weather and fundamental theories of atmospheric circulation) and seismology conducted by the Institute of Geophysics, Academy of Sciences of the Chinese People's Republic.

AD-610 986 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
MAGNETIC DISTURBANCE IN THE AREA OF OPERATIONS OF DRIFTING STATIONS NORTH POLE 3 AND NORTH POLE 4,
by N. A. Milyaev. Aug 60, 12p T-339-R
TT 61-12603

Unclassified report

Vozmushchennost' Magnitnogo Polya v Rayonakh Rabot Dreifuyuschikh Stantsii Severnyi Polyus-3 i Severnyi Polyus-4, trans. of Problemy Arktiki (USSR) 1958, no. 5, p. 73-80.
Also available from NRC mi$0.50, ph$3.00 as C-3473.

Descriptors: (*Terrestrial magnetism, Arctic regions), (*Arctic regions, Terrestrial magnetism), Ice islands, Test facilities, Instrumentation, Magnetic fields, Oscillation, Measurement, USSR.

The results of magnetic variation observations at stations North Pole 3 and North Pole 4 permit the following conclusions to be drawn: (1) In years of minimum magnetic activity (1954-1955) the mean level of disturbance in the circumpolar region is lower by 1.5 to 2 times than in the zone of maximum magnetic activity (phi = 68 degrees). (2) In the formation of the mean level of magnetic disturbance in the circumpolar region, the principal role is played by the morning and daytime disturbances. The morning disturbance maximum occurs at 3-5 hrs GMT and attains its greatest development in the summer season. Disturbance in the circumpolar (pole-cap) region is greatest in summer and is 2-3 times higher than in the winter season. (3) The night disturbance in the circumpolar region is not very noticeable and plays an insignificant part in the general level of disturbance. Disturbance is at its smallest in winter (20-30 gamma) and has very little variation throughout the 24 hours. (4) The western part of the circumpolar region of the Arctic, it seems, is inside the postulated second zone of enhanced magnetic activity and is characterized by the presence of a daytime disturbance, occurring at 13-14 hrs UT.

AD-610 987 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
FORMATION OF THE BOTTOM WATERS OF THE CENTRAL PART OF THE ARCTIC BASIN,
by V. T. Timofeev. Jan 61, 7p T-349-R
TT 61-12599

Unclassified report

Trans. of Problemy Arktiki (USSR) 1957, no. 1, p. 29-33.
Also available from NRC mi$0.50, ph$1.50 as C-3560.

Descriptors: (*Arctic Ocean, Oceanographic data), (*Ocean bottom, Arctic Ocean), Salinity, Temperature, USSR.

AD-610 988 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
PRINCIPAL RESULTS OF THE LATEST OCEANOGRAPHIC RESEARCH IN THE ARCTIC BASIN,
by P. A. Gordienko and A. F. Laktionov. Feb 61, 16p T-350-R
TT 61-22090

Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Geograficheskaya, 1960, no. 5, p. 22-33.
Also available from NRC as C-3588.

Descriptors: (*Arctic Ocean, Exploration), (*Oceanology, Arctic regions), Ocean bottom topography, Marine geology, Sea water, Physical properties, Chemical properties, Temperature, Salinity, Ocean currents, Ice islands, Tides, USSR.

The principal findings of Soviet and US Arctic Basin expeditions during the period 1955-1959 are summarized. Topics include: bottom topography; geological history; physical and chemical properties of the water masses; changes of water temperature and salinity; mixing; current and ice drift; and tidal phenomena.

AD-610 990 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).

OCEAN FLOOR STRUCTURE AND THE POLAR BASIN (THREE PAPERS),
by D. G. Panov. Dec 62, 38p T-359-R
TT 63-12800

Unclassified report

Trans. of Priroda (USSR) 1952, v. 41, no. 7, p. 92-95; Moskovskoe Obshchestvo Ispytatei Prirody. Byulleten'. Otdel Geologicheskii (USSR) 1957, v. 32(62) no. 1, p. 21-37; Akademiya Navuk BSSR, Minsk. Doklady, 1961, v. 5, no. 3, p. 118-121.
Also Available from NRC as NRC-C-4274, NRC-C-4275, and NRC-C-4276.

Descriptors: (*Ocean bottom, Structural geology), (*Arctic Ocean, Ocean bottom), (*Structural geology, Polar regions), (*Polar regions, Structural geology), Ocean bottom topography, Marine geophysics, Folds (Geology), Faults (Geology), Stratigraphy, USSR.

Contents:
The origin of the greatest world-ocean depths (trenches)
Tectonics and origin of the Central Polar Basin
Types of structure of the oceanic part of the terrestrial crust.

AD-610 992 Div. 2, 30
CFSTI Prices: HC$2.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
SEISMIC MODEL STUDY,
by Akio Takagi. Feb 64, 33p E-T-J-64-8
Contract AF19 628 3869
TT 65-61667

Unclassified report

Trans. of Jishin (Japan) 1962, ser. 2, v. 15, p. 238-254.

Descriptors: (*Seismic waves, Models(Simulations)), Seismology, Simulators, Ultrasonic radiation, Geophysics, Propagation, Japan.

A lecture presented on Japanese research in seismology using ultrasonic waves to simulate the propagation of an elastic wave with an earth model in connection with the study of the internal structure of the earth.

AD-610 994 Div. 2, 16
CFSTI Prices: HC$6.00 MF$1.25

McGill Univ., Montreal (Quebec). Dept. of Geography.
THE SAVANNA ECOSYSTEM, NORTHERN RUPUNUNI, BRITISH GUIANA,
Savanna research series,
by M. J. Eden. Jul 64, 231p
Technical rept. no. TR-1, SRS-1
Contract Nonr385500, Proj. NR387 029

Unclassified report

Descriptors: (*Ecology, British Guiana), (*British Guiana, Ecology), (*Geography, British Guiana), Terrain, Hydrology, Plants (Botany), Soils, Climatology, Genetics.

The aim of the thesis is the investigation, initially in ecological terms and subsequently on a regional basis, of a savanna environment in British Guiana. In the examination of the savanna ecosystem, attention was focused initially on the concept of the ecoclimate. This concept provides a means of expressing the influence on plant growth, in terms of moisture availability, of many elements in the ecosystem, principally climate, relief, drainage and the physical condition of the soil. Of the factors examined, climatic fluctuations during the last 12,000 years were considered the most significant, and an attempt was made to relate these to the evolution of the present savanna landscape. In addition to considerations of climatic, pedologic and anthropic factors in the ecosystem, attention was paid to correlations that have been drawn, by some writers, between older landscape surfaces and savannas. Such an interpretation represents a broader, regional approach to a problem that has, in the present thesis, been given more detailed ecological treatment.

AD-610 996 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
SOME PECULIARITIES IN THE BEHAVIOR OF THE F2 AND F1 LAYERS OF THE IONOSPHERE OVER IRKUTSK,
by V. M. Polyakov and L. A. Shchepkin. Apr 64, 14p ETR-64-16
Contract AF19 628 3869
TT 65 61666

Unclassified report

Nekotorye Osobennosti v Povedenii Sloev F2 i F1 Ionosfery nad Irkutskom, trans. of Geomagnetizm i Aeronomiya (USSR) 1961, v. 1, no. 3, p. 374-378.

Descriptors: (*Ionosphere, Periodic variation), Ionization, Diurnal variations, Recombination reactions, Partial differential equations, Frequency, USSR.

Certain properties of the ionization state in the F2 layer are analyzed from the diurnal variation of its critical frequencies as well as the recombination parameter alpha prime for a quiescent state of the ionosphere. The time when the critical frequencies of the F2 layer deviate from a simple relation with the sun's zenith angle is compared with the time when the F1 layer appears. The excess ionization, which was discovered previously in the F2 layer during earlier morning hours, is discussed. (Author)

AD-611 002 Div. 2
CFSTI Prices: HC$3.00 MF$0.75

Air Force Cambridge Research Labs., Bedford, Mass.
WINTER SPACE CORRELATIONS OF PRESSURE, TEMPERATURE, AND DENSITY TO 16 KM,
by Eugene A. Bertoni and Iver A. Lund. Dec 64, 86p AFCRL-64-1020, ERP 75

Unclassified report

Descriptors: (*Meteorological parameters, Correlation techniques), Meteorology, Statistical functions, Graphics, Tables, Weather stations, Atlantic Ocean, Europe.

The winter vertical and horizontal correlations between pressure, temperature, and density at fixed geopotential heights, to 16 km, are presented for 27 observation stations in the Atlantic Ocean and Europe. Many figures are shown to depict the decay of correlation both in the horizontal and in the vertical direction. A small effort directed toward improving the simple Markov decay function met with little success. (Author)

AD-611 003 Div. 2, 15
CFSTI Prices: HC$5.00 MF$1.00

Air Force Cambridge Research Labs., Bedford, Mass.
A COMPENDIUM OF PAPERS IN THE FIELDS OF

GEODESY AND PLANETARY GEOMETRY PREPARED AT AFCRL DURING 1963,
ed. by Owen W. Williams. Jan 65, 178p
AFCRL 65-14, Special repts. 18
Projs. 7600, 8607

Unclassified report

Descriptors: (*Geodesics, Planets), (*Planets, Geometry), (*Scientific research, Geodesics), Gravity, Astronomical geodesics, Tracking, Satellites (Artificial), Harmonic analysis, Moon, Lasers, Astronautics, Aeronautics, Instrumentation, Air Force research.

This compendium presents a series of selected technical papers prepared by scientists of Air Force Cambridge Research Laboratories during 1963 in the fields of geodesy and planetary geometry. These papers describe research activities in the areas of satellite geodesy, airborne gravimetry, instrumentation calibration via satellite, laser geodesy, land gravity instrumentation and programs, and selenodesy (geodesy of the moon). Illustrations show recent geodetic instrumentation developments and technique configurations. (Author)

AD-611 019 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
HEAT TRANSFER CHARACTERISTICS OF VENTILATED SNOW,
by Yin-Chao Yen. Jan 65, 22p
Research rept. no. 106
Tasks 5010 03136, 8X99 27 001 03

Unclassified report

Descriptors: (*Snow, Thermal conductivity), (*Heat transfer, Mathematical analysis), Water vapor, Vapor pressure, Gas flow, Diffusion.

A method of evaluating the effect of air flow on the rate of heat transfer due to vapor transfer is developed. Cold room snow samples screened for densities of 0.376 to 0.472 were used in snow beds where measurements of the steady-state temperature distribution were taken and the weight loss of the snow sample obtained at the completion of each experimental run. The essential part of the experimental apparatus is shown. The experimental technique consists of determining the effective diffusivity of water vapor through snow, which is subsequently used to calculate the contribution of heat transfer through the mechanism of vapor diffusion. The resultant equivalent thermal conductivity of snow due to vapor transfer (k sub v in cal/cm-C-sec) is represented in terms of air flow rates, ranging from about 2 to 40.0001 g/5q cm-sec. When there is no air flow through snow, k sub v contributes about 7.5% of the total value of the effective thermal conductivity of the snow (k sub e). For air flow rate of 10.0001 g/sq cm-sec or for a pore velocity of about 1.3 cm/sec, k sub v is about 19% of k sub e. Vapor pressure significantly affects the process of heat transfer in a natural snow cover.

AD-611 023 Div. 2
CFSTI Prices: HC$4.00 MF$0.75

Army Cold Regions Research and Engineering Lab., Hanover, N. H.
PROPERTIES OF SNOW.
Monograph,
by Malcolm Mellor. Dec 64, 114p Rept. no. III-A1

Unclassified report

Cold Regions Science and Engineering. Part III, Engineering. Sect. A: Snow Engineering, ed. by F. J. Sanger.

Descriptors: (*Snow, Physical properties), Impurities, Reviews, Tensile properties, Compressive properties, Creep, Loading (Mechanics), Surface properties, Thermal properties, Heat transfer, Thermal conductivity, Thermal diffusion, Thermal expansion, Electrical properties.

Contents (summarizing the information available):
Formation and composition of snow
Mechanical characteristics
Elastic behavior and ultimate strength under rapid loading
Creep under sustained loading
Surface friction and adhesion
Thermal properties and radiation characteristics
Electrical properties

AD-611 027 Div. 2
CFSTI Prices: HC$5.00 MF$1.25

Emmanuel Coll., Boston, Mass. Research Language Center.
EARTH TIDES RESEARCH: GRAVIMETRY, 1963, NO. 3,
Aug 64, 185p E-T-RC-64-1
Contract AF19 628 3869
TT 65-61678

Unclassified report

Izuchenie Zemnykh Prilivov, trans. of Gravimetriya: Sbornik Statei (USSR) 1963, no. 3.

Descriptors: (*Gravity, Measurement), Oscillation, Geophysics, Belgium, Isostatic change, Diurnal variations, Harmonic analysis, USSR, Czechoslovakia, Asia.

A collection of articles dealing with the study of the tidal variations of gravity in Central Asia and Czechoslovakia is presented. A scheme of analysis allowing the determination of parameters of the semidiurnal tidal wave from a two-day series of observations is given. A method for separating the diurnal waves K sub 1 and P sub 1 is described. A method is suggested for determining the errors in the calibration coefficient of gravimeters. The effect of non-linearity of the scale of the recorder galvanometer on the results of earth tide observations is discussed. Comparison of different methods of filling gaps in earth tide study is also given.

AD-611 029 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
THE SUNRISE EFFECTS IN THE E AND F LAYERS OF THE IONOSPHERE,
by Dchao-Shien Dchang. Mar 64, 42p E-T-Ch-64-11
Contract AF19 628 3869
TT 65-61680

Unclassified report

Trans. of Ti Ch'iu Wu Li Hsueh Pao (Chinese People's Republic) 1963, v. 12, no. 1, p. 12-31.

Descriptors: (*Solar radiation, Ionosphere), (*Ionosphere, Photochemistry), (*Photochemistry, Ionosphere), Ultraviolet radiation, Ionization, Electron density, Graphics, Geophysics, China, East Germany.

Ionograms from Station Juliusruh/Rugen in East Germany, recorded one minute before and after sunrise during the period November 1958 - October 1959, are analyzed. It is concluded that the E2 layer is a normal layer, controlled purely by solar ultraviolet radiation. The annual variation of the solar height during primary ionization is irregular, whereas the solar height of the

F layer has a regular annual variation. A theoretical study of these results shows that there is no screening layer capable of strongly absorbing the relevant solar ultraviolet radiation for both the F and E layers. The maximum electron production rates of the E1 layer for all months and the extra-terrestrial intensities of the solar L sub beta -radiation related to this layer are calculated. The cause of the E2 layer formation is also examined.

AD-611 031 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
THE ASYMMETRICAL EFFECT OF THE FLARE POSITION ON GEOMAGNETIC ACTIVITY,
by Gong-liang Zhang. Apr 64, 20p E-T-Ch-64-10
Contract AF19 628 3869
TT 65-61682

Unclassified report

Trans. of Ti Ch'iu Wu Li Hsueh Pao (Chinese People's Republic) 1963, v. 12, no. 1, p. 32-40.

Descriptors: (*Solar flares, Terrestrial magnetism), (*Terrestrial magnetism, Solar flares), Sunspots, Astrophysics, Geophysics, Northern Hemisphere, Southern Hemisphere, Statistical analysis, China.

Flares of importance > or = II(+) are grouped according to their heliographic position and magnetic condition of the active regions. Using the 'superposed-epoch method', the mean daily frequency for K sub p > or = 6 under different conditions is calculated. It is found that for the magnetic group beta gamma + gamma + beta sub f, solar flares in the northern hemisphere produce a stronger corpuscular effect than those in the southern, but for the flares in the beta sub p + beta regions, no such hemispheric asymmetry is found. Also, in the southern hemisphere, western flares have a stronger effect than the central and eastern ones, but in the northern hemisphere, only those in the beta sub p + beta regions have such an east-west asymmetry. These asymmetrical relations appeared in all of the last three sunspot cycles and were especially conspicuous during the equinoxes. (Author)

AD-611 032 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
THE MICROSTRUCTURE OF TURBULENCE IN THE LOWER TROPOSPHERE,
by Chia-i Chen, Sin Tan, and Su-zeng Dong. Feb 64, 23p E-T-Ch-64-16
Contract AF19 628 3869
TT 65-61683

Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) 1963, v. 33, no. 2, p. 271-280.

Descriptors: (*Troposphere, Wind), China, Velocity, Statistical distribution, Atmospheric motion, Turbulence, Boundary layer transition, Experimental data.

This paper analyzes Deviatova's experimental data of the horizontal wind speed fluctuations at different heights from 100 to 1470m. The main results are: (1) The horizontal wind speed fluctuations at any height may be approximated by a Gaussian distribution. (2) For heights up to a few hundred meters, the well-known '2/3' law holds within a scale of length comparable to or several times larger than the height. (3) At higher levels, the scale range in which the '2/3' law holds in usually less than the height itself and no definite relationship between this range and the height has been found. The validity of the data is also discussed. (Author)

AD-611 033 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
A THEORETICAL MODEL OF A CUMULUS CLOUD,
by L. N. Gutman. Dec 63, 11p E-T-R-64-15
Contract AF19 628 3869
TT 65-61684

Unclassified report

Teoreticheskaya Model Kuchevogo Oblaka, trans. of Akademiya Nauk SSSR. Doklady, 1957, v. 112, no. 6, p. 1033-1036.

Descriptors: (*Cumulus clouds, Mathematical models), Wind, Convection, Atmospheric motion, USSR.

A mathematical model is derived for the plane stationary problem of ordered thermal convection caused by the vertical instability of the atmosphere, with the assumption that there is no general air movement. The hydrodynamic patterns corresponding to the solution obtained are regarded as resembling a cumulus cloud. A specific example is calculated as an illustration of this conclusion. In the computed lines of flow, the cloud base lies at the level of condensation, the side boundary is drawn along the isoline w = 0.1 m/sec (where w is the vertical component of the wind velocity), the upper boundary corresponds to the isoline w = 0, the upper portion of the cloud resembles an anvil, and the anvil does not obtain when there is weaker inversion.

AD-611 036 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
REVISED MAP OF RATES OF RECENT VERTICAL MOVEMENTS OF THE CRUST IN THE WESTERN PART OF THE EUROPEAN USSR AND SOME CONSIDERATIONS ON THE PERIOD OF THESE MOVEMENTS,
by V. A. Mattskova. Jun 64, 25p E-T-R-64-34
Contract AF19 628 3869
TT 65-61705

Unclassified report

Utochnennaya Karta Skorotsti Sovremennykh Vertikal'nykh Dvizhenii Zemnoi Kory Nazapade Evropeiskoi Chasti SSSR i Nekotorye Soobrazheniya o Periode Etikhdvizhenii, trans. of Rezul'taty Issledovanii po Mezhdunarodnym Geofizicheskim Proektam (USSR) 1963, no. 1, p. 73-87.

Descriptors: (*Geodesics, USSR), (*Structural geology, USSR), Lithosphere, Motion, Velocity, Mapping, Tables, Geophysics.

CONCLUSIONS: (1) New releveling data and tide-gauge data make it possible to revise the map of rates of recent vertical movements of the crust in the western part of the European part of the USSR. The rates on the revised map vary from -6.3 to + 14.6 mm/year, with errors from ± 0.7 to ± 1.1 mm/year. (2) The trend of recent movements in the interval between relevelings is maintained on the whole. (3) From data of releveling repeated over 5-10 years, and also from series of tide-gauge observations with durations up to 10 years, exaggerated rates were obtained with errors of the

order of magnitude of the rates. (4) To determine the rate of land movement from tide-guage data, only stations with a period of observation greater than 30 years should be used. (5) Relevelings for the study of recent movements should be done over not less than 15 years (this figure should not be extended to seismically active areas). (6) Study of the period of recent movements should proceed on the basis of large quantities of statistical data. (Author)

AD-611 037 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
RECENT VERTICAL MOVEMENTS OF THE CRUST IN THE SOUTHEASTERN BALTIC REGION FROM THE DATA OF PRECISE LEVELING,
by I. P. Lesis. Jun 64, 15p E-T-R-64-35
Contract AF19 628 3869
TT 65-61706

Unclassified report

Sovremennye Vertikal'nye Dvizheniya Zemnoi Kory, na Territorii Yugo-Vostochnoi Pribaltiki po Dannym Vysokotochnykh Nibelirovok, trans. of Rezul'taty Issledovanii po Mezhdunarodnym Geofizicheskim Proektam (USSR) 1963, no. 1, p. 88-94.

Descriptors: (*Geological survey, Eastern Europe), Structural geology, Terrain, Motion, Graphics, Geodesics, USSR.

A summary is presented of the data on the vertical motions of the earth's crust according to the materials of precise levelings on the territory of the south-east Baltic regions and especially the Lithuanian SSR. The main purpose of the article is to describe the new method of adjustment of double levelings data. The method proposed is based on the combination of elements: graphical and analytical. The article gives some conclusions and proposals concerning further analysis of the vertical motions of the earth's crust. (Author)

AD-611 038 Div. 2,13
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
IS IT POSSIBLE TO REMOVE THE ICE COVER OF THE NORTHERN ARCTIC OCEAN,
by L. G. Toporkov. Apr 64, 13p E-T-R-64-23
Contract AF19 628 3869
TT 65-61707

Unclassified report

Mozhno Li Unichtozhit'ledovyi Pokrov Severnogo Ledovitogo Okeana, trans. of Priroda (USSR), 1961, v. 50, no. 11, p. 93-97.

Descriptors: (*Climatology, Arctic Ocean), (*Oceanology, Arctic Ocean), (*Arctic Ocean, Climatology), Ice islands, Melting, Ocean currents, Heat transfer, Dams, Bering Sea, Marine meteorology, Theory, Feasibility studies, Pacific Ocean.

The feasibility of a plan for the removal of the ice cover of the northern Arctic Ocean is discussed. The plan involves the construction of a dam across the Bering Straits and transferring 150,000 cubic km/year of water from the northern Arctic Ocean into the Pacific Ocean and an inflow of the Atlantic Ocean into the northern Arctic Ocean.

AD-611 043 Div. 2, 8, 24
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EXPERIMENTAL APPLICATION OF TELEVISION EQUIPMENT FOR OBSERVATION OF STARS,
by E. S. Agapov, V. F. Anisimov, V. B. Nikonov, V. V. Prokof'eva, and S. M. Sinenok. 6 Nov 64, 22p
FTD-MT-64-411
TT 65-61711

Unclassified report

Edited machine trans. of Akademiya Nauk, SSSR, Krymskaya Astrofizicheskaya Observatoriya. Izvestiya, 1963, v. 30, p. 3-18.

Descriptors: (*Television equipment, Astronomy), (*Astronomy, Television equipment), (*Photography, Television equipment), Stars, Images, Photographic recording systems, USSR.

The results of preliminary tests of the device at the Crimean Astrophysical Observatory are given. It is shown that in the photography of stars with a diameter of the image of the order of 0.1 mm there is a gain in exposure by a factor of 70 as compared to HP-3 Ilford plates. Photometric estimates of photographs obtained from the screen of the video-control apparatus can be made with a precision of not less than ±0.15 magnitude. Experimental photographs of spectra of faint stars were taken also. (Author)

AD-611 055 Div. 2, 25
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PROBLEM OF IRREGULARITY OF ASYMPTOTICS OF A VARIABLE ELECTROMAGNETIC FIELD OF A QUASISTATIONARY DIPOLE,
by L. L. Van'yan. 2 Feb 65, 6p FTD-TT-65-77
TT 65-61702

Unclassified report

Unedited rough draft trans. of Geologiya i Geofizika (USSR) 1963, no. 10, p. 160-162.

Descriptors: (*Electromagnetic fields, Excitation), (*Electrical double layer, Electromagnetic fields), Dipole moments, Geophysics, Absorption, Resistance (Electrical), Mathematical analysis, USSR.

AD-611 066 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Pacific Marine Station, Dillon Beach, Calif.
DRIFT BOTTLE STUDIES AT BODEGA HEAD, CALIFORNIA,
Research rept.,
by Robert J. Hamby. 15 Nov 64, 49p
Contract Nonr300202, Proj. NR104 626

Unclassified report

Prepared in connection with Calif. Cooperative Oceanic Fisheries Investigations.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Ocean currents, Pacific Ocean), (*Pacific Ocean, Ocean currents), California, Wind, Tides, Marine biology, Invertebrates, Larvae, Aquatic animals.

From July 7, 1962 to July 30, 1963 twenty-eight drift

bottle experiments were performed in the Bodega Bay region of Central California. The pattern of returns showed that most of the bottles were recovered within a few miles radius of Bodega Head. The possibility of a prevailing northerly current close to shore along Bodega Head is indicated. Periods of heavy northwest winds result in a dispersal of drift bottles to the south in the summer, while southeast storms and the countercurrent transport drift bottles to the north in the fall and winter. There were fewer drift bottle returns in the winter than in other months. The role of near shore currents in the dispersal of pelagic larvae of benthic invertebrates is discussed. (Author)

AD-611 072 Div. 2, 30
CFSTI Prices: HC$5.00 MF$1.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
HIGH-PRECISION OPTICAL THEODOLITES, 2D E. D., by B. S. Grishin. 23 Nov 64, 178p FTD-TT-64-653 TT 65-61686

Unclassified report

Unedited rough draft trans. of mono. Vysokotochnye Opticheskie Teodolity, 2d ed., Moscow, 1959, 148p.

Descriptors: (*Theodolites, Handbooks), Optical equipment components, Construction, Operation, Test methods, Maintenance, Cleaning, Lubrication, Refractive index, Focusing, Geodesy, USSR.

The book describes the fundamentals of the assembly, dismantling and adjustment of precision optical theodolites types OT-02 and ThB. It describes the manufacture of parts of the axial system and the study of aberrations in the telescope optical system. Rules for the care of high-precision optical theodolites are given.

AD-611 093 Div. 2, 8
CFSTI Prices: HC$3.00 MF$0.75

Boston Univ., Mass.
STUDY OF THE EARTH'S IONOSPHERE BY RECEPTION OF RADIO WAVES FROM SATELLITES. Research rept. no. 1, Sep 62-May 63, by Sunanda Basu. Oct 64, 73p Scientific rept. no. SR-1
Contract AF19 628 2350, Proj. 5629, Task 562902
AFCRL 64-831

Unclassified report

Rept. on Astronomical Contributions of Boston University Series II, No. 37.

Descriptors: (*Atmospheric sounding, Radio waves), (*Radio waves, Atmospheric sounding), (*Satellites (Artificial), Atmospheric sounding), (*Ionosphere, Scientific research), Ionospheric propagation, Electron density, Diurnal variations, Atmospherics, Test methods, Test equipment, High frequency, Very high frequency.

A study of ionospheric scintillations by the reception of signals from the Russian satellite 1962 Cosmos I was undertaken. The satellite transmitted at a frequency of 20 Mc/s and it was found possible to receive the first two harmonics at 40 Mc/s and 60 Mc/s. A high percentage of scintillation was observed on all night-time transits of the satellite. No marked variation of scintillation index with elevation angle was observed. The scintillation index varied with wavelength as lambda (0.78) for magnetically quiet days and as lambda (0.36) for magnetically disturbed days. A pronounced latitude dependence of scintillations was observed. The onset of scintillations occurred at a sub-ionospheric latitude (referred to a height of 300 km) of 35 degrees N on magnetically quiet days and the same effect was observed at 33 degrees N for magnetically disturbed days. A zone of almost uniform scintillation exists beyond a latitude of 41 degrees N. On certain occasions the satellite passed through clouds of irregularities, the size of which were about 550 km. (Author)

AD-61. 094 Div. 2, 12
CFSTI Prices: HC$3.00 MF$0.75

Iowa State Univ., Iowa City.
THE MORPHOLOGY OF THE OUTER ZONE ELECTRON DISTRIBUTION AT LOW ALTITUDES FROM JANUARY THROUGH JULY AND SEPTEMBER, 1963 FROM INJUN III,
by T. armstrong. 1964, 87p SUI-64-40
Contract Nonr150906

Unclassified report

Descriptors: (*Upper atmosphere, Electron density), Scientific satellites, Electrons, Diurnal variations, Intensity, Magnetic storms, Distribution.

An intensive study was made of data from three 213 G.M. tubes and one 302 G.M. tube which were carried on the State University of Iowa-Office of Naval Research satellite Injun III. Median latitude profiles of the electron population of the low altitude region of the outer zone for energies E sub e > or = 40 keV, E sub e > or = 230 keV, and E sub e > or = 1.6 MeV was derived. The dependence of intensity on scalar B was investigated.

AD-611 101 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Pacific Missile Range, Point Mugu, Calif.
TURBULENCE CRITERIA DERIVED FROM CONVENTIONAL ATMOSPHERIC MEASUREMENTS,
by M. A. Wolf. 19 Feb 65, 11p
Technical memo. no. PMR-TM-65-1

Unclassified report

Descriptors: (*Atmospheric motion, Determination), (*Meteorology, Atmospheric motion), Correlation techniques, Measurement, Wind, Atmospheric temperature, Kinetic theory, Stability, Texas.

Measurements of wind speeds and temperatures from the television tower at Cedar Hill, Texas, are used in the evaluation of three criteria of turbulence. Expressions are derived which relate these calculated values to average turbulence values determined from measurements of the vertical component of turbulence at five levels on the tower. The closest correlation between turbulence and the calculated criteria is achieved with a nondimensional criterion which is introduced in the study. It is suggested that the expression, relating turbulence and the N criterion, will have application to other geographical areas, provided that local effects are reflected in the kinetic energy gradient term. Extension of the N criterion to clear air turbulence is considered feasible. (Author)

AD-611 106 Div. 2
CFSTI Prices: HC$0.70 MF$0.50

Naval Oceanographic Office, Washington, D. C.
GRAVITY MEASUREMENTS OVER THE EUROPEAN CALIBRATION LINE WITH LACOSTE AND ROMBERG

GRAVITY METERS G-2, g-5, AND g-15.
Technical rept. for May-Jul 63,
by Sven C. Ernberg and Dean F. Hollensbe. Oct 64,
32p TR-169

Unclassified report

Descriptors: (*Gravity, Measurement), Europe, Geodesics, Geophysics, Meters, Calibration, Experimental data, Graphics, Tables.

A program of investigating possible non-linearity and periodical response errors of LaCoste and Romberg gravity meters over the European Calibration Line (ECL) is presented. Gravity measurements were taken at 147 gravity stations on the ECL, extending from Catania, Sicily to Bodo, Norway. Conversion factors, to correct the manufacturer's calibration tables for non-linearity, were obtained by performing a least squares adjustment on a comparison of gravity meter values with adopted gravity values at eight major stations on the ECL. The report also shows comparisons between the three gravity meters which indicate that the final results, after a correction for non-linearity, are affected by long period variations in meter response. No short period variations were detected.

AD-611 114 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
THE GEODETIC METHOD OF STUDYING RECENT MOVEMENTS OF THE CRUST AND RESULTS OF ITS APPLICATION,
by M. I. Sinyagina. Sep 64, 20p E-T-R-64-31
Contract AF19 628 3869
TT 65-61728

Unclassified report

O Geodezicheskom Metode Izucheniya Sovremennykh Dvizhenii Zemnoi Kory i Rezul'tatakh Ego Primeneniya, trans. of Rezul'taty Issledovanii po Mezhdunarodnym Geofizicheskim Proektam (USR) 1963, no. 1, p. 25-32.

Descriptors: (*Geodesics, Mapping), (*Mapping, Structural geology), (*Structural geology, Mapping), Lithosphere, Motion, Seismology, Geophysics, USSR.

The report describes the methods applied in different countries for the compilation of maps, of recent vertical movements velocities on considerable territories. Much attention is given to consideration of the principles of the choice of reference surface for the compilation of the maps mentioned above. The researches carried out in the Moscow Research Institute of Geodesy. Aerophotosurvey and Cartography proved that the most applicable reference surface in the compilation of the maps of recent vertical velocities is the surface mean level of the World Ocean, which is assumed to be constant in time. (Author)

AD-611 115 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
THE ISOSTATIC STATE OF ANTARCTICA AND DEFLECTION OF THE EARTH'S CRUST UNDER THE WEIGHT OF CONTINENTAL GLACIATION,
by S. A. Ushakov. May 64, 35p E-T-R-64-30
Contract AF19 628 3869
TT 65-61729

Unclassified report

Izostaticheskoe Sostoyanie Antarktidy i Progibanie Kory pod Nagruzkoi Materikovykh Oledenenii, trans. of Gravimetriya: Sbornik Statei (USSR) 1963, no. 4, p. 44-60.

Descriptors: (*Isostatic change, Polar regions), Glaciers, Ice islands, Loading (Mechanics), Earth, Deformation, Stability, Geophysics, USSR, Canada, Finland, Norway, Sweden.

Contents: The isostatic equilibrium of Antarctica; isostatic deflection of the earth's crust in Antarctica under the weight of an ice load; the deflection of the earth's crust under the weight of the continental glaciations of Canada and Fennoscandia; and the problem of the role of isostasy in geotectonics.

AD-611 116 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
VERTICAL MOVEMENTS OF THE CRUST, VARIATIONS OF THE GRAVITY FIELD WITH TIME, AND MOVEMENT OF SUBCRUSTAL MATERIAL,
by E. N. Lyustikh and V. A. Magnitskii. Sep 64, 10p
E-T-R-64-32
Contract AF19 628 3869
TT 65-61730

Unclassified report

Vertikal'nye Dvizheniya Zemnoi Kory, Izmeneniya Gravitatsionnogo Polya vo Vremeni i Peremeshcheniya Podkorovykh Mass, trans. of Rezul'taty Issledovanii po Mezhdunarodnym Geofizicheskim Proektam (USSR) 1963, no. 1, p. 33-36.

Descriptors: (*Gravity, Structural geology), (*Structural geology, Gravity), Geophysics, Lithosphere, Motion, Correlation techniques, USSR.

The paper discusses the correlations between the gravitational field and the vertical crustal movements and the displacements of material along the earth's surface. The regions of stable platforms, highly mobile regions and areas of modern glaciation are described. The paper shows how the vertical crustal movements are followed by subcrustal horizontal dislocations of the matter. A suggestion is made that the main cause for the vertical crustal movements on the platforms lies in the changes of the volume of matter under the crust and in the lower layers of the crust. (Author)

AD-611 117 Div. 2, 25
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
EMISSION SPECTRA OF DISCRETE SOURCES CASSIOPEIA-A, CYGNUS-A, TAURUS-A, VIRGO-A AT 12.5-40 MC FREQUENCIES,
by L. L. Bazelyan. Jul 64, 15p E-T-R-64-38
Contract AF19 628 3869
TT 65-61731

Unclassified report

Spektry Radioizlucheniya Diskretnykh Istochikov Kassiopeya-A, Lebed'-A, Telets-A, i Deva-A na Chastotakh 12, 5-40 Mgts, trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Radiofizika (USSR) 1963, v. 6, no. 5, p. 897-903.

Descriptors: (*Radiofrequency spectroscopy, Stars), (*Extraterrestrial radio waves, Radiofrequency spectroscopy), High frequency, Emissivity, Radio astronomy, Radio interference, Telescopes, USSR.

For four discrete radio sources, results of measuring radiation in a 12.5 - 40 mc band are given. A characteristic decrease in the spectra of three sources at frequencies below 20 - 25 mc is noted. The results are used to calculate the characteristic parameters of the sources (emissivity and ratio H /n sub e) under the assumption that a decrease in the spectrum is caused either by absorption in clouds H sub H or by a decrease in the refractive index at the source. (Author)

AD-611 118 Div. 2, 9
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
MOTION OF WATER DROPLETS IN TURBULENT CLOUDS,
by S. Pancsev. Mar 64, 10p E-T-R-64-22
Contract AF19 628 3869 Unclassified report
TT 65-61732

Dvizhenie Vodyanykh Kapel' v Turbulentnykh Oblakakh, trans. of Idojaras (Hungary) 1960, v. 64, no. 5, p. 276-280.

Descriptors: (*Clouds, Moisture), (*Fluid mechanics, Clouds), (*Coagulation, Drops), Atmospheric motion, Convection, Numerical analysis, Motion, Velocity, Hungary.

The author deals with the coagulation of water droplets streaming in turbulent air currents. The essential problem is to determine to what extent streaming water droplets are carried by turbulent pulsations. The velocity-increasing effect of the pulsations is proved numerically. This result implies that the probability for collisions is also increased. (Author)

AD-611 119 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanual Coll., Boston, Mass. Research Language Center.
THE THEORY OF THE PROGRESS OF CRYSTALLIZATION IN SUPERCOOLED CLOUDS,
by V. I. Belyaev. Apr 64, 13p E-T-R-64-25
Contract AF19 628 3869 Unclassified report
TT 61-61733

K Teorii Rasprostraneniya Kristallizatsii v Pereokhlazhdennykh Oblakakh, trans. of Akademiya Nauk SSSR. Doklady, 1963, v. 151, no. 4, p. 841-845.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. A copy is available for public sale.

Descriptors: (*Clouds, Crystallization), (*Crystallization, Artificial precipitation), Ice, Crystals, Supercooling, Theory, Phase studies, USSR.

The solution of the complete problem of the progress of crystallization in supercooled clouds which takes crystal precipitation into consideration very awkward. This work presents an approximate theory of the progress of crystallization in supercooled clouds. The theory takes into account the gradual precipitation of ice crystals from a cloud and can be applied to the entire period of the crystallization progress in the clouds.

AD-611 120 Div. 2, 13
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
A PLAN FOR IMPROVING THE CLIMATE OF PRIMORSKII KRAI,
by D. U. Vapnyar and V. V. Pokudov. May 64, 16p
E-T-R-64-26
Contract AF19 628 3869
TT 65-61734 Unclassified report

O Proekte Ulushcheniya Klimata Primor'ya, trans. of Meteorologiya i Gidrologiya (USSR) 1961, no. 3, p. 43-45.

Descriptors: (*Climatology, Far East), (*Oceanology, Far East), Japan Sea, Okhotsk Sea, Ocean currents, Heat transfer, Dams, Marine meteorology, Geophysics, USSR, Feasibility studies.

The feasibility of a plan for improving the climate of Primorskii Krai (far east Russia) by constructing a dam across the Nevelskii Straits, between the Sea of Japan and the Sea of Okhotsk is discussed. The problem of what changes might occur in the hydrological regime of the Sea of Japan if this dam were constructed is investigated.

AD-611 121 Div. 2, 8, 12
CFSTI Prices: HC$2.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
RADAR INVESTIGATIONS OF THE STRUCTURE OF THE IONOSPHERE WITH THE SATELLITE 'COSMOS' ON COHERENT FREQUENCIES.
Preliminary rept.,
by Ya. L. Al'pert, V. B. Belyanskii, and N. A. Mityakov. Apr 64, 34p E-T-R-64-19
Contract AF19 628 3869 Unclassified report
TT 65-61735

O Radioissledovaniyakh Struktury Ionosfery pri Pomoshchi ISZ 'Kosmos' na Kogerentnykh Chastotakh (Predvaritel 'nye Rezul'taty), trans. of Geomagnetizm i Aeronomiya (USSR) 1963, v. 3, no. 1, p. 10-24.

Descriptors: (*Ionospheric propagation, Radio waves), (*Atmospheric sounding, Satellites (Artificial)), (*Satellites (Artificial), Atmospheric sounding), Radar signals, Doppler effect, Ionosphere, Doppler radar, Electron density, Atmospheric refraction, USSR.

This article shows the results of a preliminary analysis dealing with the differences in the Doppler shift of coherent radio wave frequencies delta phi, emanating from satellites 'Cosmos I' and 'Cosmos II' on frequencies of 20. 005 and 90. 0225 megacycles/sec. New data has been obtained concerning the gradient of the large scale heterogeneity of electron concentration along a satellite orbit and its linear scale. (Author)

AD-611 122 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
SOVIET GEOPHYSICAL EXPLORATIONS IN THE ANTARCTIC,
by S. A. Ushakov. May 64, 21p E-T-R-64-29
Contract AF19 628 3869 Unclassified report
TT 65-61736

Sovetskie Razvedochnye Geofizicheskie Issledovaniya v Antarktike, trans. of Gravimetriya: Sbornik Statei (USSR) 1963, no. 4, p. 22-30.

Descriptors: (*Geophysical prospecting, Polar regions), Seismology, Ice, Thickness, Determination, Gravity, Terrestrial magnetism, Geophysics, USSR.

Contents: Seismic determinations of ice thickness; gravimetric operations of the Antarctic continent; nautical gravimetric studies; and magneto-survey operations.

AD-611 123 Div. 2
CFSTI Prices: HC$3.00 MF$0.75

Emmanuel Coll., Boston, Mass. Research Language Center.
A GEOPHYSICAL INTERPRETATION OF THE DATA ON THE NEWEST AND RECENT PLUTONIC TECTONIC MOVEMENTS,
by M. V. Gzovskii. Jul 64, 66p E-T-R-64-33
Contract AF19 628 3869
TT 65-61737
Unclassified report

Geofizicheskaya Interpretatsiya Donnykh o Noveiskikh i Sovremennykh Glubinnykh Tekonicheskikh Dvizheniyakh, trans. of Rezul'taty Issledovanii po Mezhdunarodnym Geofizicheskim Proektam (USSR) 1963, no. 1, p. 37-63.

Descriptors: (*Geophysics, Lithosphere), (*Earth, Stresses), Isostatic change, Gravity, Structural geology, Earth, USSR.

Data relating to the phenomena of the recent and newest tectonic movements on the upper surface of the earth's crust can be used to explain the important features of the subsurface geological and geophysical processes which at the present time are developing within the earth's crust and in the upper portion of the subcrustal mantle (in the upper mantle). The vertical velocity component of tectonic movements gives a basis for objectively relating the recent and newest movements of each region to one of the genetic types when one compares the sign of this component with data from subsurface seismic soundings and with the sign of the true isostatic gravity anomaly. The movements directed towards an isostatically equilibrated position of the earth's crust are principally different in origin from the movements by which the earth's crust is removed from an isostatically equilibrated position. Further separation and explanation of the movements would be hypothetical at the present time. A comparison of the values of the vertical and horizontal velocity components of the recent and newest movements will make it possible to make a selection more valid than the present one between the two main current hypotheses about the physical nature of the subsurface processes occuring within the earth's crust and in the subcrustal mantle.

AD-611 129 Div. 2
CFSTI Prices: HC$4.00 MF$1.00

Alberta Univ., Edmonton. Dept. of Physics.
CRUSTAL STRUCTURE IN WESTERN CANADA.
Scientific rept. no. 1, May 63-Sep 64,
by George L. Cumming and Gerrit T. Maureau.
Nov 64, 129p
Contract AF19 628 2835, Proj. 8652, Task 865202
AFCRL 65-15
Unclassified report

Rept. on Proj. VELA-UNIFORM.

Descriptors: (*Structural geology, Canada), (*Canada, Structural geology), (*Seismology, Canada), Underground explosions, Seismic waves, Propagation, Velocity, Seismographs, Stratigraphy, Mapping, Geophysics.

A double-ended refraction profile was shot between Suffield, Alberta and Swift Current, Saskatchewan. A six layer earth model was obtained from these data, the crustal thickness under the east shot point (Swift Current) being 42 kms and the thickness under the west shot point (Suffield) being 51 kms. These data are similar in general form to those reported by Meyer and McCamy in Montana, just south of our line. Previous control west from Suffield has been extended into the Rocky Mountains. Since these data are not reversed, definitive interpretation is not possible. Some alternative interpretations are presented. Spectral analyses were also carried out on many of the records. Power spectra indicate that there is little change in frequency with distance from the shot point. They do, however, indicate that there are two dominant frequencies of seismic information, one at about 5 cps and another at about 10 cps. Shot environment determines which of these two is more important. (Author)

AD-611 209 Div. 2
CFSTI Prices: HC$4.00 MF$1.00

Wisconsin Univ., Madison. Dept. of Meteorology.
STUDIES OF THE EFFECTS OF VARIATIONS IN BOUNDARY CONDITIONS ON THE ATMOSPHERIC BOUNDARY LAYER.
Annual rept. no. 2,
by Heinz H. Lettau, Charles R. Stearns, Arlin B. Super, and John C. Turner. Dec 64, 128p
Contract DA36 039AMC00878, Task 1AO 11001B021 08
Unclassified report

See also 429 496

Descriptors: (*Climatology, Boundary layer), (*Micrometeorology, Atmospheric motion), (*Wind, Meteorological phenomena), (*Turbulent boundary layer, Analysis), Jet streams, Stresses, Water, Air, Surfaces, Ice, Solar radiation, Lakes.

Contents: Preliminary results of air mass modification study over Lake Mendota, by Arlin B. Super; A thermal response experiment on lake ice, by John Colin Turner; Report on wind profile modification experiments using fields of Christmas trees on the ice of Lake Mendota, by Charles Stearns; Preliminary note on the effect of terrain-slope on low-level jets and thermal winds in the planetary boundary layer, by H. Lettau.

AD-611 210 Div. 2
CFSTI Prices: HC$3.00 MF$0.75

Texas A and M Univ., College Station Dept. of Oceanography and Meteorology.
SUMMARY OF AUTOMATED ENVIRONMENTAL DATA COLLECTED OFF PANAMA CITY, FLORIDA, JUNE 1962 - DECEMBER 1964,
by A. Kirst, Jr. and R. D. Gaul. 31 Dec 64, 59p
Ref-65-2T
Contract Nonr211904, Projs. NR083 036, 286D
Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.

Descriptors: (*Oceanographic data, Florida), (*Meteorological parameters, Florida), (*Data processing systems, Geophysics), Telemeter systems, Data transmission systems, Transducers, Data storage systems, Information retrieval, Digital computers, Oceanographic equipment, Meteorological instruments, Automation.

The data acquisition and telemetry equipment is on two fixed platforms which are 11 and 1.6 nautical miles offshore. The system is designed to simultaneously serve two major functions. One is the semi-continuous acquisition of 'background' environmental information. The second is the continuous or semi-continuous acquisition of data prescribed for individual studies or experiments. Brief descriptions of system arrangement, functions, engineering characteristics and data handling procedures insofar as they are pertinent to general

evaluations and use of the data system generates are given. A tabulation of the parameters time periods of collection for data taken between June 1962 and October 1964 is included. These data are available for processing.

AD-611 268 Div. 2
CFSTI Prices: HC$4.00 MF$1.00

Air Force Cambridge Research Labs., Bedford, Mass.
A COMPENDIUM OF PAPERS IN THE FIELDS OF WAVE PROPAGATION AND GEOTECHNICS PREPARED AT AFCRL DURING 1963,
by Owen W. Williams. Dec 64, 121p
Rept. nos. AFCRL-64-998, Special repts. no. SR-17
Projs. 8623, 8652

Unclassified report

Descriptors: (*Seismic waves, Propagation), (*Deserts, United States), (*Geophysics, Seismology), Underground explosions, Identification systems, Lithosphere, Mechanical properties, Models (Simulations), Air Force research, Bibliographies, Reports, Aerial photography.

CONTENTS: Wave propagation (seismology): The layer-matrix method in seismic wave propagation problems; mechanical properties of the earth's upper mantle; full field seismic modelling; some elementary considerations on the use of multiple discrimination criteria in the seismic identification of underground explosions. Geotechnics: Interpretation of geologic properties of desert playas from aerial photography; pictorial section; appendices which provide tabulations of additional papers published during 1963 in the fields of seismology and geology by AFCRL scientists as well as those published by contractor personnel.

AD-611 279 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
PRELIMINARY RESEARCH OF CONVECTIVE HEAT TRANSFER IN THE LOWER ATMOSPHERIC LAYER,
by Ming-yu Chou. Oct 64, 18p E-T-Ch-64-26
Contract AF19 628 3869
TT 65-61751

Unclassified report

Trans. of Ch'i Hsiang Hsueh Pao (Chinese People's Republic) 1963, v. 33, no. 3, p. 290-296.

Descriptors: (*Atmospheric motion, Heat transfer), (*Heat transfer, Atmospheric motion), (*Convection, Atmospheric temperature), Mathematical models, Thermodynamics, Atmosphere, Micrometeorology, China.

Based on an analysis of the interaction between convective heat transfer and atmospheric stratification, this paper preliminarily establishes a model of convective heat transfer, and numerical computation is given. The results of the computation show that the interaction between heat transfer and atmospheric stratification plays an important role in heat transfer. Heat flux is much greater during unstable stratification than during stable stratification. As a consequence of the vertical transfer of heat flux, atmospheric stratification clearly changes in the initial stage, while in the final stage, it approximates neutral stratification. (Author)

AD-611 308 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
AN AIRBORNE INSTALLATION FOR COMPLEX MEASUREMENT OF THE METEOROLOGICAL AND DYNAMIC CHARACTERISTICS OF THE ATMOSPHERE, INCLUDING CLOUDS,
by V. I. Skatskii and V. V. Shchelokov. Dec 63,
18p E-T-R-63-13
Contract AF19 628 3869
TT 65-61753

Unclassified report

Samoletnaya Ustanovka dlya Kompleksnogo Izmereniya Meteorologicheskikh i Dinamicheskikh Kharakteristik Atmosfery, v Tom Chisle Oblakov, trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Geoficheskaya, 1963, no. 8, p. 1270-1277.

Descriptors: (*Meterological instruments, Airborne), Atmospheric temperature, Humidity, Clouds, Atmospheric precipitation, Thermometers, Hygrometers, Accelerometers, Oscillographs, Flight instruments, Clocks.

A description is given for a portable airborne installation which includes quick-response (tau less than 1 sec) devices which continually record the averaged air temperature, temperature fluctuations, humidity, the load factors of the plane, the plane's speed and deviation from the given flight pattern. Line drawings of the devices are shown. (Author)

AD-611 312 Div. 2
CFSTI Prices: HC$4.00 MF$1.00

Texas A and M Univ., College Station. Dept. of Oceanography and Meteorology.
MESOSCALE CIRCULATION OF THE ATMOSPHERIC BOUNDARY LAYER. PART I.
Final rept., pt. 1,
by Kenneth C. Brundidge and Hideo Beniura.
Jan 65, 129p
Contract AF19 604 7455, Projs. 7655, 270,
Task 765501
AFCRL 65-63 P1

Unclassified report

Masters' theses.

Descriptors: (*Air mass analysis, Micrometeorology), (*Atmospheric motion, Air mass analysis), (*Micrometeorology, Air mass analysis), Fluid flow, Atmosphere, Boundary layer, Measurement, Meteorological instruments, Towers, Texas, Meteorological parameters.

Results are given of research conducted in three major areas: (1) the temperature and wind structure of cold fronts. (2) determination of the eddy heat coefficient under fair-weather conditions, and (3) the determination of the eddy heat coefficient in frontal zones. The investigations were based upon data collected on the 1420-ft. KRLD-WFAA transmitter tower at Cedar Hill, Texas. This volume pertains only to the first area. This section deals specifically with the structure of cold fronts. By making suitable assumptions it was possible to determine the motion of the air relative to the thermal fields of the fronts. The results indicated considerable cross-isentropic motion. In turn, these results implied, as extreme possibilities, that either the temperature structure of the fronts was undergoing radical change as a result of the particles following an adiabatic process or, the temperature structure was conservative and the particles were undergoing non-adiabatic processes.

AD-611 313 Div. 2
CFSTI Prices: HC$6.00 MF$1.25

Texas A and M Univ., College Station. Dept. of Oceanography and Meteorology.
MESOSCALE CIRCULATIONS OF THE ATMOSPHERIC BOUNDARY LAYER. PART II.
Final rept., pt. 2,
by Kenneth C. Brundidge, Eugene You June Wong, Bill Chatten Ryan, and Edward Francis Conlan.
Jan 65, 227p
Contract AF19 604 7455, Projs. 7655, 270, Task 765501
AFCRL 65-63 P2

Unclassified report

Masters' Theses.
See also AD-611 312.

Descriptors: (*Air mass analysis, Micrometeorology), (*Atmospheric motion, Air mass analysis), (*Micrometeorology, Air mass analysis), Fluid flow, Atmosphere, Boundary layer, Heat transfer coefficients, Measurement, Meteorological instruments, Towers, Texas, Meteorological parameters.

Results are given of research conducted in three major areas: (1) the temperature and wind structure of cold fronts, (2) determination of the eddy heat coefficient under fair-weather conditions, and (3) the determination of the eddy heat coefficient in frontal zones. The investigations were based upon data collected on the 1420-ft. KRLD-WFAA transmitter tower at Cedar Hill, Texas. This volume pertains only to areas two and three.

AD-611 324 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Norwegian Inst. of Cosmic Physics.
CURRENT DENSITIES IN VISUAL AURORAS,
Scientific rept. no. 7,
by A. Omholt and H. Lorentsen. 1964, 20p
Contract AF61 052 680
AFCRL 65-58

Unclassified report

Prepared in cooperation with Oslo Univ. (Norway). Inst. of Physics.
See also AD-603 849.

Descriptors: (*Aurorae, Electrical properties), Density, Electric currents, Electric fields, Magnetic storms, Geophysics, Norway.

The magnetic perturbations associated with quiet auroral forms with a fairly simple geometry (auroral arcs, broad bands, and glow) were studied, using the magnetic records from stations in and near the auroral zone. The north-south spacing between the stations was 60 - 80 kms. From the height distribution of auroral luminosity and the other parameters involved the Pedersen and Hall conductivities were computed as functions of height during the aurora. From these curves it is seen that the vertical thickness of the conducting layer is about 25 km, regardless of whether Hall or Pedersen currents are the dominating depends on the direction of the electric field applied and the possibility of creating a polarization field across the arc or band. It is deduced that in all the auroral forms the current densities must be a few times 10 to the minus 9th power A/sq cm and the electric field of the order of magnitude 0.001 V/cm.

AD-611 325 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Norwegian Inst. of Cosmic Physics.
STUDIES OF LOCAL MORPHOLOGY, STRUCTURE AND DYNAMICS OF AURORA.
Final rept. for 1 Mar 63-30 Nov 64,
by Anders Omholt. Dec 64, 29p
Contract AF61 052 680
AFCRL 65-60

Unclassified report

Prepared in cooperation with Oslo Univ. (Norway).
See also AD-611 324.

Descriptors: (*Aurorae, Physical properties), Spectroscopy, Interferometers, Doppler effect, Very low frequency, Atmospherics, Solar radiation, Excitation, Electric currents, Night sky, Nitrogen, Electrons, Energy, Nuclear physics.

Research in the following areas is summarized: Interferometric measurements of the 5200/02 NI-doublet in the aurora; observations and experiments pertinent to auroral theories; variations in the doppler profile of Halpha in aurorae; emissions in the VLF-band observed near the auroral zone, part I. occurence of emissions during disturbances part II. the physical properties of the emissions; excitation of A10 bands in the sunlit atmosphere and determination of the temperature from the distribution among the vibrational levels; current densities in visual auroras; variations in energy spectrum of auroral electrons detected by simultaneous observations with photometer and riometer; studies on the excitation of N2 and N2(+) bands in aurora; rapid movements of auroral rays; temperature measurements from N2(+) bands in aurora; spectrophotometric investigations of nightglow and aurora; and the construction and application of a four-channel photometer for auroral research.

AD-611 326 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Norwegian Inst. of Cosmic Physics.
VARIATIONS IN ENERGY SPECTRUM OF AURORAL ELECTRONS DETECTED BY SIMULTANEOUS OBSERVATION WITH PHOTOMETER AND RIOMETER,
by O. E. Johansen. 1964, 25p
Scientific rept. no. SR-8
Contracts AF61 052 680, AF61 052 686
AFCRL 65-59

Unclassified report

See also AD-611 325

Descriptors: (*Aurorae, Atomic energy levels), Energy, Electrons, Excitation, Ionization, Luminescence, Absorption, Diurnal variations, Measurement, Photometers.

Limited to cases with homogeneous auroral forms covering most of the sky, observations at lambda 5577 A and 27.6 MHz show that the energy spectrum can remain constant for long periods, from half an hour to several hours and whole nights. Large and rapid variations do however occur, but less frequent than one could expect from satellite observations. This indicates that many variations in electron energy spectrum observed by satellite borne instruments are variations in space rather than variations in time. An average over three winters shows a diurnal variation in the energy spectrum with a hardening in the spectral shape between 20 and 01 local time. An unexpected high and variable light intensity corresponding to zero riometer absorption is also discussed. (Author)

AD-611 330 Div. 2
CFSTI Prices: HC$3.00 MF$0.75

Rochester Univ., N. Y. Dept. of Physics and Astronomy.

HIGH ENERGY COSMIC GAMMA RADIATION,
by E. M. Hafner and G. Share. 1964, 69p
URPA-64
Grant AF AFOSR439 63
NP 14661

Unclassified report

Descriptors: (*Gamma rays, Cosmic rays), Meteorological balloons, Measurements, Charged particles, Photons, Scintillation counters, Intensity, Counting methods, Telescopes, High altitude.

A sequence of ten balloon-borne experiments was designed to detect gamma rays by conversion in lead. The counter telescopes were sensitive to radiation from directions near zenith; nominal acceptance cones of 10 degrees, 30 degrees, and 60 degrees have been used. Seven of the flights produced useful data at high altitude, with results in three classes: i) an isotropic background flux of at least .0006 gamma/sq cm -sec-ster which may be of primary origin; ii) an anomalous flux from 20 hr. right ascension and +30 degrees declination, with an intensity of at least .0002 gamma/sq cm-sec; and iii) several short time variations of gamma ray and charged particle fluxes. There is as yet no explanation for the time variations, but similar effects have recently been reported from another experiment at lower energy. (Author)

AD-611 337 Div. 2, 9
CFSTI Prices: HC$2.00 MF$0.50

Washington Univ., Seattle. Dept. of Atmospheric Sciences.
PRELIMINARY STUDIES OF FORMATION AND STABILITY OF CONCENTRATED VORTICES NEAR THE GROUND.
Scientific rept.,
by K. H. Bergman, J. A. Turner, and J. A. Businger.
Dec 64, 35p
Grant DA AMC36 039 63G1

Uclassified report

Descriptors: (*Vortices, Atmospheric motion), (*Atmospheric motion, Vortices), Stability, Boundary layer, Perturbation theory, Models (Simulations), Mathematical analysis, Tornadoes.

The report summarizes the present status of a continuing investigation into the mysteries of the small-scale atmospheric vortex, usually known as the 'dust devil' or 'whirlwind'. Many of the basic concepts of vortex flow presented apply to the larger-scale tornado as well.

AD-611 339 Div. 2

Harvard Coll., Cambridge, Mass. Observatory.
CONCERNING A LUNAR MODULATION OF GEOMAGNETIC ACTIVITY.
Revised ed.,
by B. Bell and R. J. Defouw. 27 Apr 64, 11p
Scientific rept. no. SR-1
Contracts AF19 628 3322, AF19 604 4962, Proj. 7649, Task 764906
AFCRL 64-983

Unclassified report

Revision of 3 Jan 64. Pub. in Journal of Geophysical Research (U. S.) v69 n15 p3169-74 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Terrestial magnetism, Moon), (*Periodic variations, Terrestial magnetism), Magnetic storms, Statistical analysis.

The behavior of the daily K sub p index of magnetic activity is investigated as a function of lunar phase by the method of superposed epochs. The analysis indicates a slight but statistically significant enhancement of geomagnetic disturbance during several days following full moon and, with marginal significance, a slight diminution of disturbance during several days preceding full moon. A small dip in K sub p, found at the phase of new moon, is shown to be without statistical significance. (Author)

AD-611 344 Div. 2

Stanford Electronics Labs., Stanford Univ., Calif.
A QUALITATIVE EXPLANATION OF THE DIURNAL VARIATION OF CHORUS.
Revised edition,
by N. Brice. 28 Jul 64, 3p
Grant AF AFOSR62 370
AFOSR 65-0263

Unclassified report

Pub. in Journal of Geophysical Research (U. S.) v69 n21 p4701-03 1964 (Copies not available to DDC or Clearinghouse customers).
Revision of report dated 25 Jun 64.

Descriptors: (*Dawn chorus, Diurnal variations), Electrons, Very low frequency, Radio waves, Plasma physics, Solar wind, Geophysics.

It is suggested that the VLF emissions called chorus are generated by the transverse resonance plasma instability for electrons and that the production of this instability requires anisotropy in the electron velocity distribution. Phenomena which might give rise to the required anisotropy are considered. It is suggested that the compression of the outer magnetosphere by the solar wind would assist in producing the anisotropy. While no attempt is made to explain the systematic shift in the time of maximum chorus occurrence with latitude, it is shown that the compression of the magnetosphere leads to an explanation of the observation that chorus is generally observed between dawn and noon. A conservative estimate of the rate of increase in transverse energy of energetic electrons arising from this compression is found to be orders of magnitude greater than that required to explain the energies observed in chorus. (Author)

AD-611 361 Div. 2, 4, 16
CFSTI Prices: HC$1.00 MF$0.50

British Columbia Univ., Vancouver. Inst. of Oceanography.
FATTY ACIDS DERIVED FROM LIPIDS OF MARINE ORIGIN.
Final rept.,
by P. M. Williams. 12 Feb 65, 3p
Grant Nonr G00056 62, Proj. NR108 533

Unclassified report

Descriptors: (*Sea water, Fatty acids), (*Fatty acids, Sea water), (*Marine biology, Lipids), (*Lipids, Marine biology), Plankton, Fishes, Biochemistry, Tissue extracts, Ocean bottom, Canada.

The occurrence and distribution of fatty acids in marine phytoplankton, marine surface sediments and in the particulate and dissolved organic matter of sea water was investigated as a means of delineating the pathways and transformations of organic carbon from its origin in marine phytoplankton through higher trophic levels into the sediments. All samples were taken at locations in the Northest Pacific Ocean adjacent to Vancouver Island, British Columbia, Canada. The origin of the dissolved and particulate fatty acids in sea water was not evident from a comparison of their individual distribution patterns with those found in phytoplankton, zooplankton or in higher trophic forms. (Extracted)

AD-611 363 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Stanford Electronics Labs., Stanford Univ., Calif.
SOME TECHNIQUES FOR MEASURING AND RECORDING DOPPLER SHIFTS FROM DRIFTING METEOR TRAILS,
by Robert Nowak. Nov 64, 32p
SEL-64,121, Scientific rept. no. SR-1
Contract AF19 628 3996, Proj. 8628, Task 862808
AFCRL 64-1016

Unclassified report

Descriptors: (*Doppler effect, Meteors), (*Meteors, Doppler effect), (*Atmospheric sounding, Radar signals), Ionosphere, Ionization, Measurement, Radar equipment, Filters (Electromagnetic wave), Data processing systems, Wiring diagrams, Fourier analysis, Atmospheric motion.

Several methods of measuring and analyzing Doppler shifts produced by moving meteor trails (from which windspeeds at E-region heights can be deduced) are presented. Emphasis is placed on obtaining the data in such a way that they can be reduced easily and quickly so that measurements can be made and evaluated on a routine basis. Using one of the described systems, several thousand data points were obtained during an 18-day period; their evaluation led to results very similar to ones obtained elsewhere. (Author)

AD-611 372 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
THERMAL ANOMALIES ON THE TOTALLY ECLIPSED MOON OF DECEMBER 19, 1964,
by J. M. Saari and R. W. Shorthill. Jan 65 11p
D1-82-0404

Unclassified report

Also available from the author.

Descriptors: (*Lunar eclipses, Thermal properties), (*Moon, Thermal properties), Infrared scanning, Telescopes, Extraterrestrial topography, Mapping, Astrophysics, Astronomical observatories, Egypt.

The lunar disk was scanned in the infrared nine times during the total eclipse of December 19, 1964 using the 74-inch Kottamia telescope in Egypt. As expected from previous work, the major ray craters cooled less rapidly than their environs. However, hundreds of localized hot spots were discovered on the disk, some of which have been identified with small ray craters. Mare Humorum and certain portions of other seas were found to be thermally enhanced compared to their surroundings. (Author)

AD-611 373 Div. 2, 25
CFSTI Prices: HC$2.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
EFFECTS OF THERMAL EXPANSION ON THE MOMENTS OF INERTIA OF THE MOON,
by Zdenek Kopal. Jan 65, 31p
Mathematical Note No. MN-384, D1-82-0400

Unclassified report

Also available from the author.

Descriptors: (*Moon, Moment of inertia), (*Moment of inertia, Moon), (*Thermal expansion, Moon), Solar radiation, Heat transfer, Fourier analysis, Deformation, Differential equations, Elasticity, Boundary value problems.

Thermal conduction problem for a homogeneous sphere illuminated by a parallel beam of light is solved in terms of Fourier-Bessel expansions; and the resulting non-symmetric deformation due to thermal expansion is established on the assumption that the (self-gravitating) sphere behaves like an elastic solid. The moments of inertia about the principal axes of so deformed a body are then computed for a configuration approximating in physical properties the lunar globe as deformed by secular effects of insolation; and it is shown that the ratio of the differences of the momenta (C-A)/B which can arise from this cause is much too small to account for its value deduced from the librations. (Author)

AD-611 374 Div. 2, 25
CFSTI Prices: HC$1.00 MF$0.50

Boeing Scientific Research Labs., Seattle, Wash.
POSSIBLE EFFECTS OF CONVECTION OF LUNAR MOMENTS OF INERTIA,
by Zdenek Kopal. Jan 65 18p
Mathematical Note No. MN-385, D1-82-0401

Unclassified report

Also available from the author.

Descriptors: (*Moon, Moment of inertia), (*Moment of inertia), (*Convection, Moon), Thermal expansion, Density, Liquids, Viscosity, Boundary value problems, Bessel functions, Spheres, Fluid flow.

The differences in moments of inertia of a homogeneous globe of viscous liquid arising from steady convection in its interior are evaluated on the basis of a linearized theory of such motion as developed by Chandrasekhar in 1952. It is shown that if the physical characteristics of such a globe are made to approximate the anticipated properties of the Moon, with the same difference C - A of momenta about its principal axes of inertia, Chandrasekhar's theory requires the velocity of convective motion to be of the order of 10 to the minus 8th power cm/sec (too small for the establishment of steady flow for a globe of lunar dimensions in 10 to the 9th power years); and a characteristic Rayleigh number several hundred times as large as that required theoretically for the stability of the respective flow. As the physical basis of Chandrasekhar's theory should be closely applicable to the lunar problem, it is concluded that internal convection conforming to it - if it exists- does not lend itself for the actual explanation of the difference in momenta C - A of the lunar globe as deduced from its librations. (Author)

AD-611 400 Div. 2

Central Radio Propagation Lab., National Bureau of Standards, Boulder, Colo.
EXTENSION OF PROGRAMS FOR CALCULATIONS OF GREAT CIRCLE PATHS AND SUNRISE-SUNSET TIMES,
by H. H. Crary. 18 Feb 65, 24p
Technical note no. TN-303
ARPA Order 183

Unclassified report

Available from Superintendent of Documents, GPO, Washington, D. C., 20402, $0.25, as C13.46:303. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.

Descriptors: (*Celestial mechanics, Programming (Computers)), (*Solar radiation, Diurnal variations), (*Astronomy, Programming (Computers)), Sun, Light transmission, Sky brightness, Twilight, Very low frequency, Ionospheric propagation, Time, Mathematical prediction.

A previous note by Brady and Crombie (NBS TN 209) describes methods and a program for calculating and plotting sunrise and sunset times at specified heights and distances along a great circle path determined by the locations of the end points. The program also plots the distribution of darkness or daylight along the path versus time. This program has been modified to remove some restrictions on the use of the earlier program, and to provide the option of calculating the short or long great circle path. In addition, transmitter, receiver, and solar bearings are also calculated and plotted. Some interesting characteristics of the short and long paths from Rugby, England, to Byrd Station, Antarctica, are shown. (Author)

AD-611 419 Div. 2, 5, 6, 30
CFSTI Prices: HC$1.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
TESTS OF A MOTION PICKUP OF THE INFRA-RED TYPE,
by Floyd E. Nelson. Oct 64, 23p
Technical note N-623
Proj. Y R011 01 01 056

Unclassified report

Descriptors: (*Infrared equipment, Liquid level gages), (*Liquid level gages, Motion), (*Motion, Ocean waves), Infrared photoelectric cells, Infrared pulses, Infrared detectors, Test methods, Oceanographic equipment.

A pickup suitable for the measurement of ocean water level variations is described. Tests were conducted in the laboratory of a development model of the motion pickup using an infra-red source (light bulb) as the motion sensor. Specifically, an infra-red sensitive photocell is positioned so as to receive energy from a source only when a hole in the rim of a wheel is in the plane of the source and the center of the wheel. Then, as the wheel is caused to rotate, the cell receives a pulse of energy, through the hole from the moving source and thereby activates a time measuring circuit. The wheel continues to rotate until the hole is next positioned so that the cell receives a pulse of energy from a fixed source. This causes the time measuring circuit to stop and from calibration data the position of the moving source relative to a given horizontal plane is calculated and recorded (plotted). Successive positions of the moving source are calculated and recorded to provide a continuous record as a function of time of the displacement of the moving source.

AD-611 433 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Academy of Natural Sciences of Philadelphia, Pa.
STUDIES ON THE MARINE QUATERNARY.
Final rept. for 1 Jan-31 Jan 64,
by Horace G. Richards. 5 Feb 65, 7p
Grant Nonr G00044 64

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested. Copy is available for public sale.

Descriptors: (*Marine geology, Paleontology), (*Paleontology, Aquatic animals), Geologic age determination, Seacoast, Ecology, Mollusca, Gastropoda, Pelecypoda, Argentina, Chile, New Jersey, Virginia, California, Europe.

Progress is reported on the study of the Quaternary changes of shoreline in various parts of the world and the interpretation of the temperature, depth, and other ecological factors based on fossil invertebrates. Principal areas of research included Argentina, Chile, continental shelf off New Jersey, Virginia, Canary Islands, California, and Europe.

AD-611 437 Div. 2
CFSTI Prices: HC$3.00 MF$0.75

Iowa State Univ., Iowa City.
DIURNAL AND LATITUDE EFFECTS OBSERVED FOR 10 keV ELECTRONS AT LOW SATELLITE ALTITUDES,
by Theodore A. Fritz and Donald A. Gurnett.
Feb 65, 60p U. of Iowa 65-3
Contract Nonr150906; Grant NsG233 62

Unclassified report

Descriptors: (*Atmospheric sounding, Electron density), (*Electron density, Atmosphere), (*Satellites (Artificial), Atmospheric sounding), Diurnal variations, Energy, Electrons, Measurement, Electron multipliers, Orbital trajectories, Calibration, Terrestrial magnetism, Geophysics.

Using a low energy electron detector on the low altitude, high latitude satellite Injun III, large diurnal and latitude effects have been observed for 10 keV electrons. It is found that intense fluxes of low energy electrons, J(E sub e > or = keV) > or = 2.5 x 10 to the 7th power electrons (sq cm ster sec)/1, occur only during local night between 1700 hours and 0700 hours (magnetic local time) and that they occur only between 58 degrees and 76 degrees invariant latitude. These intense fluxes of low energy electrons occur predominantly during periods of high geomagnetic activity. It is also found that a large change in the slope of the electron energy spectrum is associated with the trapping boundary for 40 keV electrons found at high latitudes during local night. This change is from a relatively hard spectrum inside the boundary to a very soft spectrum just outside the boundary. The intense fluxes of very soft electrons found beyond the 40 keV trapping boundary at low altitudes are thought to be related to the intense fluxes of low energy electrons found by Gringauz (Planet. Space Sci., 9:21-25 (1962)) and by Freeman (J. Geophys. Res., 69:1691-1724 (1964)) at great distances on the night side of the earth. (Author)

AD-611 441 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Institute of Science and Tech., Univ. of Michigan, Ann Arbor.
VESIAC SEMIANNUAL INDEX (NO. 4) OF BULLETIN CONTENTS.
15 Jan 65, 10p

Unclassified report

Descriptors: (*Seismology, Bibliography), (*Bibliography, Seismology), (*Underground explosions, Identification systems), Seismic waves, Earthquakes, Nuclear explosions, Detection, Underwater explosions, Geophysics.

Reference is made to issues 19 through 24 of the Bulletin wherein there are entries for the projects, grants, orders, and contracts of AFCRL, AFOSR, AFTCA, ARPA, BuShips, and ONR.

AD-611 442 Div. 2, 6
CFSTI Prices: HC$3.00 MF$0.75

Army Electronics Command, Fort Monmouth, N. J.
A METEOROLOGICAL ROCKET BEACON TRACKING SYSTEM,
by Arthur A. Coppola. Oct 64, 55p Technical rept. no. ECOM-2477
Task 1V025001A126 02

Unclassified report

Descriptors: (*Sounding rockets, Tracking), (*Radiosondes, Tracking), (*Tracking, Sounding rockets), Rocket trajectories, Ascent trajectories, Density, Meteorological instruments, Telemeter systems, Velocity, Position finding.

A system designed to track rocket-borne beacons to an altitude of 500,000 feet, without the requirement of radar support, is described. The system, designed for use by the Pacific Missile Range to obtain density data during rocket ascent, consists of modifications and additions incorporated into the basic Rawin Set AN/GMD-1B in order to provide a relatively low-cost tracking system. Analysis of flight data obtained indicates that the design goals were attained. Rapid variations in pulse-rate telemetry can be reproduced and reduced through a comparison technique. Rocket-altitude data, when compared with data obtained with Radar Set AN/FPS-16, show an agreement to within 0.23 percent. The basic system accuracy in determining velocity proved to be as predicted: one percent or better. However, there were instances where deviations of velocity data, when compared with radar-determined velocities, were in excess of one percent. These were traceable to system noise preventing accurate readout. (Author)

3. Chemical Warfare Equipment and Materials

No Entries

4. Chemistry

AD-610 870 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Minnesota Univ., Minneapolis.
THE EFFECT OF STRUCTURE ON THE RATE OF DEOXYMERCURATION,
by Maurice M. Kreevoy. 1960, 3p
Contract AF49 638 711
AFOSR TN60 751

Unclassified report

Descriptors: (*Mercury compounds, Chemical reactions), (*Metalorganic compounds, Molecular structure), Molecular isomerism, Thermochemistry, Reaction kinetics, Heat of activation, Chemical bonds, Deuterated compounds, Alkenes, Iodides, Complex compounds.

Consideration is given to the rate-determining step of deoxymercuration and its transition state. Evidence suggests that the initially formed isomer is trans and the product of the rate-determining step is an olefin-mercuric monoiodide complex. Both cis and trans isomers apparently require a planar transition state, a series of which are proposed.

AD-610 883 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
EFFECT OF pH DURING PRECIPITATION OF ALUMINUM SOAPS ON THE VISCOSITY OF THE OLEOGELS AND EFFECT OF TEMPERATURE ON THE PROPERTIES OF ALUMINUM SOAPS,
by A. A. Trapeznikov and G. V. Belugina. 3 Nov 53, 6p T-105-R
TT 65-61632

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1952, v. 87, no. 4, p. 635-637; no. 5, p. 825-827.

Descriptors: (*Aluminum soaps, Chemical properties), Gels, Chemical precipitation, pH, Molecular structure, Temperature, USSR.

AD-610 884 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE ACTION OF CERTAIN DIHALOID HYDROCARBON DERIVATIVES ON ETHYL ESTER OF PHOSPHOROUS ACID AND ON SALTS OF DIETHYL PHOSPHOROUS ACID,
by A. E. Arbuzov and N. P. Kushkova. 13 Nov 53, 11p T-107-R
TT 65 61634

Unclassified report

Trans. of Zhurnal Obshchei Khimii (USSR) 1936, v. 6, no. 2, p. 283-288.

Descriptors: (*Phosphonic acids, Synthesis (Chemistry)), (*Organic phosphorus compounds, Chemical reactions), (*Phosphites, Chemical reactions), (*Halogenated hydrocarbons, Chemical reactions), Esters, Salts, Iodides, Bromides, USSR.

The reaction of methylene iodide with the ethyl ester of phosphorus acid yielded iodomethyl phosphorous acid diethyl ester (I), rather than the expected ethyl ester of methane diphosphonic acid (II). The reaction of (I) with Na diethyl phosphite (III) also failed to yield (II), and the action of K diethyl phosphite on (I) resulted in an ethyl ester of hydroxymethyl phosphonic acid (IV). The saponification of (IV) gave the hydroxymethyl phosphonic acid HOCH2PO(OH)2. The ethyl ester of propane diphosphonic acid (V) was formed as the reaction product of trimethylene bromide and (III). The saponification product of (V) was a very stable tetrabasic acid.

AD-610 887 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ON THE STRUCTURE OF HYPOPHOSPHOROUS ACID. III. THE REACTION OF THE AROMATIC DIAZO-COMPOUNDS WITH PHOSPHORUS TRICHLORIDE AND SODIUM DI-ISOPROPYL-PHOSPHITE,
by V. M. Plets. 5 Dec 49, 5p T-6-R
TT 65 61620

Unclassified report

O Stroenii Fosfornovatistoi Kisloty. III. O Reaktsii Aromaticheskikh Diazosoedinenii s Trekh-khloristym Fosforom i Diizopropilfosforistokislym Natriem, trans. of Zhurnal Obshchei Khimii (USSR) 1937, v. 7, no. 1, p. 270-272.
See also AD-610 942.

Descriptors: (*Phosphites, Molecular structure), (*Organic nitrogen compounds, Chemical reactions), (*Organic phosphorus compounds, Synthesis (Chemistry)), Sodium compounds, Phosphorus compounds, Chlorides, Aromatic compounds, Hydrazine derivatives, Amines, USSR.

The attempted reaction of PC13 with phenyl-diazonium chloride and with phenyl-diazonium nitrate demonstrated the inability of PC13 to form phosphor-organic compounds with aromatic diazo compounds. This is in contrast to analogous reactions using As and Sb salts. Similarly, no phosphor-organic compounds were obtained when Na di-isopropyl phosphite was made to react with phenyl-diazonium chloride. The above reactions reveal a sharp difference between phosphorus acid and hypophosphorus acid with respect to the ability of the salts of the acids to react with diazo-derivatives. Incomplete studies of the reactions of PC13 with methylamine-HC1 and with diazo-methane tend to confirm these results.

AD-610 888 Div. 4, 30
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE FLOW METHOD OF ULTRAMICROSCOPE MEASUREMENT OF THE PARTICLE CONCENTRATION OF AEROSOLS AND OTHER DISPERSION SYSTEMS,
by G. Vlasenko and G. Deryagin. 7 Jan 50, 5p T-9-R
TT 59-17171

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady 1948, v. 63, no. 2, p. 155-158.

Descriptors: (*Aerosols, Visual inspection), (*Particles, Counting methods), (*Visual inspection, Aerosols), Microscopy, Fluid flow, Sprays, Atomization, USSR, Flow visualization.

A method is suggested for making a particle count in a continuous stream of aerosol flowing in a direction parallel

to the line of sight, with the particles traversing a zone of illumination in a set time. If the total observed number of the little flashes in the field of view made by particles crossing the zone of illumination is divided by the volume of the aerosol flowing over the field, the particle concentration is obtained.

AD-610 894 Div. 4, 25
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ON THE CONTACT-ANGLES OF SMALL DROPLETS,
by I. Petryanov and N. Rozenblyum. 14 Aug 50,
7p T-23-R
TT 59-15979

Unclassified report

Trans. of Akademiya Nauk SSR. Doklady, 1948, v. 61, no. 4, p. 661-664.

Descriptors: (*Drops, Surface properties), (*Solids, Surface properties), Asbestos, Fibers (Natural), Liquids, Films, Oils, Microstructure, Electron microscopy, USSR.

According to the theory of incomplete wetting, when a liquid is brought into contact with a solid surface, there are produced, after the break-up of a liquid film which becomes unstable within a certain interval of thickness, droplets which have a certain finite contact-angle and a thin stable film of liquid which may exceed monomolecular dimensions. It is assumed that the magnitude of the contact-angle for any given solid surface and liquid does not depend on the size of the droplet. The contact-angles of droplets are studied where dimensions approach the distance at which molecular forces are probably operative. Droplets of titanium oxychloride and oil on asbestos fibers were photographed in an electron microscope.

AD-610 897 Div. 4,10,14
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
A RESEARCH ON THE SORPTION OF WATER VAPOR ON ACTIVE CHARCOALS,
by M. M. Dubinin and E. D. Zaverina. 15 Sep 50,
6p T-24-R
TT 65 61625

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady 1948, v. 61, no. 1, p. 79-82.
See also AD-610 898.

Descriptors: (*Charcoal, Microstructure), (*Water vapor, Sorption), (*Sorption, Charcoal), Porosity, Adsorption, Gases, Chemical equilibrium, Test methods, USSR, Hysteresis, Surface properties, Oxidation.

According to the proposed hypothesis on the nature of water-vapor sorption on active charcoal there takes place, in the region before the sharp rise of the S-shaped isotherm, a monomolecular adsorption of water vapor. The formation of a condensed adsorption-film brings about wetting, and causes the micropores of the charcoal to fill up through capillary condensation. The equilibrium pressure p in volume, corresponding to the two-dimensional saturated vapor pressure of the adsorption-film, is dependent on the differential heat of adsorption, and decreases for the more active surface-areas, the fine pores of the charcoal. The non-uniformity of the charcoal surface as regards adsorption leads to a progressive filling-up of micropores of greater and greater size and over a relatively narrow range of pressures. An effect qualitatively similar to the progressive activation of the charcoal may be obtained by introducing into the charcoal a small quantity of a vapor which adsorbs well and fills up the more active portions of the surface of the charcoal, that is. the small-pore part of the volume.

AD-610 898 Div. 4, 10, 14
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
SORPTION AND STRUCTURE OF ACTIVE CHARCOALS. II. EXAMINATION OF THE SORPTION OF WATER VAPOR,
by M. M. Dubinin and E. D. Zaverina. 6 Oct 50,
20p T-25-R
TT 65 61626

Unclassified report

Sorbtsiya i Struktura Aktivnykh Uglei. II. Issledovanie Sorbtsii Vodyanykh Parov, trans. of Zhurnal Fizicheskoi Khimii (USSR) 1947, v. 21, no. 12, p. 1373-1386.
Also available from NRC as TT-186.
See also AD-610 897.

Descriptors: (*Charcoal, Microstructure), (*Sorption, Charcoal), (*Water vapor, Sorption), Porosity, Adsorption, Test methods, Hysteresis, Vapors, Oxidation, Films, Surface properties, USSR.

The problem of the sorption of water vapor on active charcoals has attracted the attention of many research workers. The basic works on the subject have not produced general agreement on the nature of the sorption process. The influence of the structure of active charcoals on the sorption of water vapor has not been systematically studied. (Author)

AD-610 900 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario)
ON THE FIRST MEMBERS OF THE SERIES OF CACODYL (CACODYL-PHOSPHONIC) ESTERS,
by Gil'm Kamai and E. M.-Sh. Bastanov. 17 Mar 54,
5p T-116-R
TT 65 61628

Unclassified report

O Pervykh Predstavitelyakh Kakodilfosfinovykh Efirov, trans. of Akademiya Nauk SSSR. Doklady, 1953, v. 89, no. 4, p. 693-695.

Descriptors: (*Phosphonic acids, Esters), (*Organic phosphorus compounds, Chemical reactions), (*Arsenic compounds, Chemical reactions), Phosphites, Halides, Chemical bonds, Decomposition, Oxidation, Hydrolysis, Chemical properties, Physical properties, USSR.

The methyl-, ethyl-, n-propyl-, iso-propyl-, and n-butyl-esters of dimethyl cacodyl phosphinic acid were obtained by the reaction of dimethyl bromarsine and the relevant alkyl esters of phosphorous acid. A corresponding set of diethyl cacodyl phosphinic acid esters was prepared by the action of diethyl chlorarsine on trialkyl phosphites. The reaction schemes of formation, yields, physical properties, and chemical properties of both sets of esters were similar. The As-P bond in all of the product compounds could be easily disrupted by hydrogen halides, alkalis, and atmospheric oxygen.

AD-610 927 Div. 4,16
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
QUANTITATIVE DETERMINATION OF NITRITES AND OXIDES OF NITROGEN IN PUBLIC HEALTH PRACTICE,
by L. A. Mokhov, Yu. F. Udalov, and V. S. Khalturin.
Sep 60, 3p T-341-R
TT 61 12601

Unclassified report

Trans. of Laboratornoe Delo (USSR) 1959, v. 5, no. 2, p. 45-46.
Also available from NRC mi$0.50, ph$1.50 as C-3474, 2p.

Descriptors: (*Nitrogen compounds, Oxides), (*Nitrites, Quantitative analysis), (*Colorimetric analysis, Nitrogen compounds), (*Public health, Colorimetric analysis), Wastes (Industrial), Exhaust gases, Water, Meat, Amines, Benzoates, Vitamin B complex, Sulfonates, USSR.

A colorimetric method is given for the determination of nitrogen oxides in air and nitrites in water and meat. The method is based on the diazotization of acidified p-aminobenzoic aicd by the nitrogen compounds in the presence of 1-amino-8-naphthol-disulfonic acid. The resultant crimson dye is compared against a standard calibration curve. The sensitivity of the method is 0.001 mg/1, and the precision of the determination is 0.0005 mg.

AD-610 942 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ON THE STRUCTURE OF HYPOPHOSPHOROUS ACID. II. ON THE REACTION OF THE AROMATIC HYDRAZINES WITH THE SALTS OF HYPOPHOSPHOROUS ACID.
by V. M. Plets. 5 Dec 49, 4p T-5-R
TT 65 61637

Unclassified report

Trans. of Zhurnal Obshchei Khimii (USSR) 1937, v. 7, no. 1, p. 90-92.

Descriptors: (*Phosphites, Molecular structure), (*Hydrazine derivatives, Chemical reactions), (*Phosphinic acids, Synthesis (Chemistry)), Sodium compounds, Aromatic compounds, Bromides, Amines, Salts, USSR, Organic phosphorus compounds.

The reaction between phenyl-, p-bromophenyl-, and p-nitrophenyl-hydrazine with sodium hypophosphite was investigated and the resulting phosphinic acids were characterized. An attempted reaction of sodium phosphite with phenyl-hydrazine was not successful.

AD-611 006 Div. 4, 14
CFSTI Prices: HC$2.00 MF$0.50

Air Force Materials Lab., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A GENERAL SPECTROCHEMICAL METHOD FOR THE DETERMINATION OF IMPURITIES IN Hf02, Ti02, AND Zr02.
Rept. for Jan 63-Jul 64,
by James H. Muntz. Dec 64, 29p ML-TR-64-357
Proj. 7360, Task 736005

Unclassified report

Descriptors: (*Refractory materials, Chemical analysis), (*Hafnium compounds, Dioxides), (*Titanium compounds, Dioxides), (*Zirconium compounds, Dioxides), Spectroscopy, Impurities, Absorption spectrum.

The need for the analysis of many types of refractory materials made it desirable to have one method that would be applicable to as many of these materials as possible. The method developed provides identical conditions for sample preparation, excitation, and other steps in the analysis of HfO2, TiO2, and ZrO2 and compounds or materials that can be converted to the oxides. The technique involves the use of a mixed buffer-carrier, a controlled atmosphere, relatively high amperage, and a short exposure time. Conditions were selected to give optimum sensitivity for impurities with minimum spectral interference from the matrix. Determination of some of the refractory impurities such as Hf in ZrO2, as well as the more volatile impurities is possible. Sixteen impurity elements can be determined, most of them in the 10-1000 ppm range, with an overall precision of about ± 20 percent. Two additional impurity elements are determined semi-quantitatively by visual estimation. (Author)

AD-611 024 Div. 4, 20
CFSTI Prices: HC$2.00 MF$0.50

Air Force Cambridge Research Labs., Bedford, Mass.
THE ION EXCHANGE PROPERTIES OF CERIUM (IV) COMPOUNDS.
Physical Sciences Research papers,
by G. G. Rocco, J. R. Weiner, and J. P. Cali. Dec 64, 45p AFCRL 64-1018, PSRP-73
Proj. 5620

Unclassified report

Prepared in cooperation with Tracerlab Div. of Laboratory for Electronics, Waltham, Mass.,
Contract AF19 628 3844.

Descriptors: (*Radiochemistry, Ion exchange), (*Cerium compounds, Ion exchange), (*Ion exchange, Cerium compounds), Phosphates, Oxides, Synthesis (Chemistry), Reaction kinetics, Alkali metals, Sodium, Cesium, Barium, Separation, Impurities, Antimony, pH, Volumetric analysis, Radioactivation analysis.

The ion exchange properties of ceric phosphate were investigated including rates of reaction, distribution coefficients of alkali metals, capacity and column behavior of some elements. Ceric oxide was shown to possess anion exchange properties in acid solution and cation exchange properties in basic solution. The two compounds have properties analogous to, but not identical with, zirconium oxide and phosphate. Cesium and barium were successfully separated on a short column of ceric phosphate at room temperature. These inorganic ion-exchangers show promise of providing additional means for effecting and widening the scope of radiochemical separations, an important and necessary consideration in the radioactivation analysis, of trace elements in ultrapure materials. (Author)

AD-611 061 Div. 4, 25
CFSTI Prices: HC$1.00 MF$0.50

Princeton Univ., N. J.
DIELECTRIC RELAXATION AND STRUCTURE.
Progress rept. no. 4, 1 Apr-30 Sep 64,
by Charles P. Smyth. 30 Sep 64, 5p
CRD-AA-C-2364-C
Contract DA31 124ARO D109

Unclassified report

Descriptors: (*Organic compounds, Dielectric properties), (*Dielectric properties, Organic

compounds), Solids, Liquids, Molecular structure, Molecular rotation, Relaxation time, Dipole moments, Atomic properties, Polarization, Ethers, Amines, Halides, Microwave spectroscopy.

The measurements of dielectric constant and loss for eight rigid molecules at 2.2 mm wavelength at various temperatures were used to obtain the optical dielectric constant, the value of which was close to the square of the refractive index. There seemed to be no evidence of an additional ultrahigh frequency dispersion region. The dielectric constants and losses of ten primary alkyl alcohols at various temperatures and 16 wavelengths were used to characterize different mechanisms of dielectric relaxation in these compounds. It is concluded that the first relaxation time is determined by the rupture of hydrogen bonds in the molecular aggregates and subsequent rotation of the molecular dipoles. The second and third relaxation times are probably due to the overall rotation of the monomeric molecules present and the intramolecular rotation of the OH group, respectively. Dielectric measurements on seven water-dioxane mixtures at various temperatures and wavelengths were analyzed in terms of two separate relaxation times. The shorter relaxation time was attributed to the overall molecular rotation of free water molecules, and the longer to the partial breaking of the hydrogen bond and subsequent rotation of the dipole. Dielectric constants and losses of binary mixtures of benzophenone in tetrahydrofuran, pyridine and chloroform, 2-chloronapthalene in pyridine, and 4-iodobiphenyl in chloroform were measured at wavelengths of 2.2 mm, 1.2, 3, and 10 cm. The data gave two relaxation times, one corresponding to the larger and the other to the smaller molecule.

AD-611 085 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
OBTAINING ELEMENTARY BORON IN A GLOW DISCHARGE,
by L. R. Markovskii, V. I. L'vova, and Yu. D. Kondrashev. 4 Feb 65, 13p FTD-MT-64-427
TT 65-61719

Unclassified report

Edited machine trans. of mono. Konferentsiya po Khimii Bora i Ego Soedinenii (Conference on the Chemistry of Boron and Its Compounds) Moscow, 1955. Trudy, 1958, p. 36-45.

Descriptors: (*Boron, Preparation), (*Glow discharges, Boron), Boron compounds, Chlorides, Reduction (Chemistry), Hydrogen, Reaction kinetics, Purification, USSR.

A process of reduction of boron chloride by hydrogen is given which can be expediently conducted in a glow discharge during pressure from 30 to 200 mm Hg. The formation of elementary boron both in highly dispersed state and also in the form of growths on electrodes depends upon the kinetic and electrical conditions of the process. Laboratory production of highly dispersed boron with purity up to 99.9% and yield to 50% from boron chloride in a glow discharge is possible with a single passage of the gas mixture through the discharge. According to the data of comparative x-ray investigations of elementary boron obtained by different methods, electrodischarge boron is the purest and the most typical sample of microcrystalline boron. (Author)

AD-611 087 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
DENSITY AND VISCOSITY OF NITROGEN TETROXIDE SOLUTIONS IN 70% NITRIC ACID,
by M. M. Karavaev and V. A. Zhantalai. 21 Jan 65, 8p FTD-TT-64-879
TT 65-61721

Unclassified report

Unedited rough draft trans. of Zhurnal Fizicheskoi Khimii (USSR) 1963, v. 37, no. 12, p. 2771-2773.

Descriptors: (*Nitrogen compounds, Tetroxides), (*Nitric acid, Solutions), Density, Viscosity, Thermal properties, USSR.

Density of nitrogen tetroxide solutions in 70.05%-HNO_3 changes rectilinearly in dependence upon the N_2O_4 concentration in the solution and temperature. An equation is introduced, allowing the calculation of the density of mixtures with nitrogen tetroxide concentrations up to 10% by weight and in the range of temperatures of from -10 to 20C. Viscosity of nitrogen tetroxide solutions in 70%-HNO_3 remains practically unchanged (within limits of determination accuracy) with change in N_2O_4 concentration in the solution. When the temperature drops, viscosity of the system rises irregularly. (Author)

AD-611 139 Div. 4, 26, 30
CFSTI Prices: HC$2.00 MF$0.50

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
THE CAL PRESSURE WAVE CHEMICAL REACTOR,
by A. Hertzberg, W. Squire and H. S. Glick.
Jan 56, 33p CAL rept. no. AD-1052-A-13
Contract AF18 603 10, Proj. 9783, Task 37725
AFOSR TN-64-2530

Unclassified report

Descriptors: (*Shock tubes, Chemical reactions), (*Industrial equipment, Feasibility studies), (*Chemical engineering, Shock tubes), (*Nitrogen compounds, Oxides), Gases, Oxygen, Nitrogen, High-temperature research, Reaction kinetics, Fluid mechanics, Thermodynamics, Shock waves, Temperature control.

A novel type of chemical reactor which utilizes strong pressure waves to heat and cool gases rapidly and uniformly is proposed. Its principal advantages over existing devices are claimed to be: (1) extremely rapid rates of heating and cooling reacting gases, (2) very precise control over reaction parameters, (3) effective reaction temperatures far above maximum wall temperatures, (4) a continuous flow system with a rate of chemical production competitive with other units of comparable size, and (5) low energy consumption per unit mass of product as compared with other reactors using similar chemistry. On the basis of a preliminary survey of reactions to which such a reactor might be applied, a detailed analysis was made of its application to the fixation of atmospheric nitrogen. Calculations of the mass handling capacity, net energy requirement, size of auxiliary equipment, etc., for an industrial wave reactor were carried out. The calculated yields and energy requirements compared favorably with other processes.

AD-611 152 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Cincinnati Univ., Ohio.
THE ENERGETICS OF THE COMBINATION OF A PROTON AND HYDRIDE ION.
Final rept. for 1 Sep 63-30 Sep 64,
by Raymond E. Dessy. 30 Sep 64, 12p
Grant AF AFOSR417 63
AFOSR 65-0245

Unclassified report

Report includes The Ability of 'Inert Salts' to Enhance the Rate of Reaction of Grignard Reagents with Unsaturated Linkages, by Gordon R. Coe, Raymond E. Dessy, and Stuart I. E. Green.

Descriptors: (*Hydrides, Thermochemistry), (*Thermochemistry, Ions), (*Grignard reagents, Reaction kinetics), (*Metalorganic compounds, Reaction kinetics), Protons, Nuclear magnetic resonance, Chemical equilibrium, Exchange reactions, Salts, Lithium compounds, Ammonium compounds, Perchlorates, Magnesium compounds, Bromides, Nitriles, Ketones.

The rate of addition of the 'BuMgBr' Grignard reagent to benzonitrile was found to be greatly accelerated by the addition of LiClO4 or (C4H9)4NClO4. An investigation of the reaction mechanism leads to the suggestion that the phenomena represents an example of the activation of organometallic compounds by the presence of 'inert salts'. Studies in the area of carbanion stabilities are briefly summarized.

AD-611 157 Div. 4, 25
CFSTI Prices: HC$1.00 MF$0.50

Johns Hopkins Univ., Baltimore, Md.
THE SPECTRA OF RARE EARTH IONS.
Final rept.,
by G. H. Dieke. 31 Jan 62, 17p
Contract AF49 638 535
AFOSR 2305

Unclassified report

This rept. includes THE SPECTRA OF RARE EARTH IONS, III. Annual rept., 31 Dec 61.

Descriptors: (*Rare earth elements, Spectroscopy), (*Atomic energy levels, Rare earth elements), Ions, Valence, Glow discharges, Spectrum (Visible and ultraviolet), Praseodymium, Ytterbium, Neodymium, Gadolinium, Holmium, Europium, Atomic orbitals, Ionization, Spectrum analyzers, Lasers, Masers.

The primary purpose of the work was to obtain the energy levels and other data of the free trivalent rare earth ions in order to have a sound basis for comparison with the levels of the same ions in solid state matter. The procedure of attacking the problem was to establish first the proper experimental conditions for obtaining and separating the various stages of ionization. A new method was developed by studying the time decay of the individual lines in the afterglow of a spark with time resolution of the order of 0.0000001 sec. The third and fourth spectra of the following rare earths were photographed extensively: Pr, Nd, Gd, Ho, Er, Yb. Exploratory results were achieved on the remaining ones (except Pm). Wave length measurements, often 20 000 to 30 000 lines per element, were made on most of the six elements. The spectra of divalent ions of Pr and Yb were also analyzed.

AD-611 158 Div. 4

Minnesota Univ., St. Paul.
INVESTIGATIONS INTO CELLULOSE AND RELATED SUBSTANCES. THE CONSTITUTION OF METHOCEL.
Rept. no. 14 (Final),
by B. F. Smith, B. A. Lewis, and F. Smith. 1962, 8p
Contract DA11 022ORD2644
AROD 2020 5

Unclassified report

Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Methyl cellulose, Molecular structure), (*Cellulose, Molecular structure), Glucose, Halogenation, Alcohols, Saccharides, Chemical precipitation, Periodates, Oxidation, Hydrolysis.

Methocel (a partially methylated cellulose derivative) was fractionated by precipitation with thymol, and the various fractions were subjected to periodate oxidation. The resulting dihalides were then hydrolyzed with H2S04. The findings indicate that only certain glucose units are affected by the methylating reagents and that they are probably located in the same general region of the cellulose molecular complex. The areas of the molecular complex attacked by periodate appear to be those unaffected by the methylating reagent. It is concluded that the above areas correspond to the crystalline regions of the complex.

AD-611 164 Div. 4, 25
CFSTI Prices: HC$1.00 MF$0.50

Rensselaer Polytechnic Inst., Troy, N. Y.
STRUCTURE AND PROPERTIES OF MOLTEN SALTS.
Final rept.,
by George J. Janz. Dec 64, 11p
Contract AF49 638 50; Grant AF AFOSR181 63,
AFOSR 65-0244

Unclassified report

Contract AF49 638 978; Grant AF AFOSR181 63B.

Descriptors: (*Salts, Liquids), Physical properties, Chemical properties, Molecular structure, Electrolytes, Melting, Thermodynamics, Heat of activation, Viscosity, Fluid flow, Electrical conductance.

A summary is given of physico-chemical studies which resulted in new insights into the chemical and structural nature of molten inorganic salts. For the purpose of providing a guide to the selection of molten salts for particular applications or structural studies, a classification scheme is proposed (based on the energies of activation) for viscous flow and electrical conductance.

AD-611 193 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Johns Hopkins Univ., Baltimore, Md.
THE FAR INFRARED SPECTRUM OF TETRAHYDROFURAN,
by Walter J. Lafferty and Dean W. Robinson. 1961, 8p
Contract AF49 638 468
AFOSR 2366

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*O-heterocyclic compounds, Spectra (Infrared)), (*Infrared spectroscopy, O-heterocyclic compounds), Vapors, Molecular structure, Transformations, Chemical bonds, Vibration, Absorption spectrum, Band spectrum.

An examination of the vapor-phase spectrum of tetrahydrofuran between 30/cm and 400/cm revealed a series of fairly broad bands at 34.25, 40.5, 47.5, 54.0, 59.6, 66.8, and 81.2/cm. The absorption peaks are tentatively attributed to the transitions of a pseudo-rotator. An intense broad band with sharp peaks at 233, 243, 276, and 279/cm is assigned to the 'ordinary' ring puckering mode and is thought to be the result of the upper stage transitions of this vibration.

AD-611 203 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

North Carolina Univ., Chapel Hill.
CHELOMETRIC TITRATIONS WITH AMPEROMETRIC END POINT DETECTION.
by R. R. Campbell and Charles N. Reilley.
1960, 20p
Contract AF49 638 333
AFOSR 1547

Unclassified report

Descriptors: (*Volumetric analysis, Complex compounds), (*Complex compounds, Volumetric analysis), Electrochemistry, Electrodes, Mercury, Oxygen, Buffers (Chemistry), Copper, Calcium, Magnesium, Zinc, Cadmium, Nickel, Lead, Bismuth, Ethylenedinitrilo tetraacetates.

The use of the anodic chelon wave as the indicator wave in amperometric titrations extends the usefulness of amperometric analysis by including those metal ions that exhibit ill-defined reduction waves. Furthermore, mixtures of metal ions whose log K values differ by less than 4 units can be titrated selectively, a procedure that is not practical by potentiometric analysis. This method allows the choice of both buffers and chelons in order to obtain optimum selectivity. The time required for an analysis is much less than for the usual amperometric methods since dissolved oxygen need not be removed from the system and the solution can be stirred continuously. A primary disadvantage of the method is the interference from halide ions. However, with reasonable care, this difficulty is avoided by excluding halide ions from the analytical solution.

AD-611 289 Div. 4

California Univ., Berkeley.
AN HMO TREATMENT OF THE REDUCTION OF AROMATIC HYDROCARBONS WITH ALKALI METALS; REDUCTION OF FLUORANTHENE,
by A. Streitwieser, Jr. and S. Suzuki. 19 Apr 61, 16p
Contract AF49 638 105
AFOSR 65-0214

Unclassified report

Pub. in Tetrahedron (Gt. Brit.) v16 p153-68 1961 (Copies available only to DDC users).

Descriptors: (*Aromatic compounds, Reduction (Chemistry)), (*Polycyclic compounds, Reduction (Chemistry)), (*Alkali metals, Oxidation-reduction reactions), Hydrocarbons, Atomic orbitals, Field theory, Ammonia, Sodium, Lithium, Spectra (Visible and ultraviolet).

Simple molecular orbital theory is applied to the metal-ammonia reduction of aromatic hydrocarbons. The theory is based on protonation at sites of highest electron density in the corresponding anions. Good agreement is observed between predicted and observed reduction products. The reduction of the non-alternant hydrocarbon fluoranthene takes an anomalous course that is not inconsistent with the theory. Evidence is presented to show that an initial dihydro-reduction product, 2,3-dihydrofluoranthene, undergoes a Michael addition by its conjugate anion to yield 1,2,2',3,3', 10b-hexahydro-1,2'-bifluoranthyl. (Author)

AD-611 290 Div. 4

California Univ., Berkeley.
APPLICATION OF THE MOLECULAR ORBITAL OMEGA-TECHNIQUE TO AROMATIC SUBSTITUTION,
by A. Streitwieser, Jr., J. I. Brauman, and J. B. Bush.
31 Jan 62, 14p
Contract AF49 638 105
AFOSR 65-0213

Unclassified report

Pub. in Tetrahedron (Gt. Brit.) v19 suppl2 p379-91 1963 (Copies available only to DDC users).

Descriptors: (*Aromatic compounds, Substitution reactions), (*Polycyclic compounds, Nitration), (*Substitution reactions, Theory), Hydrocarbons, Atomic orbitals, Field theory, Reaction kinetics, Chemical bonds, Thermochemistry.

The omega-technique of the simple Molecular Orbital method is found to provide a reasonably good correlation with the available experimental data on partial rate factors of nitration of alternant and non-alternant polycyclic aromatic hydrocarbons. (Author)

AD-611 298 Div. 4

Royal Inst. of Tech., Stockholm (Sweden).
STUDIES IN THE HYDROLYSIS OF METAL IONS 33. A MINIATURE SOLUBILITY COLUMN AND ITS APPLICATION TO A STUDY OF THE SOLUBILITY OF RED MERCURY (II) OXIDE IN ACID 3 M NaC1O4 SOLUTIONS,
by David Dyrssen and Valentine Tyrrell. 1 Oct 60, 11p Technical note no. TN-11
Contract AF61 052 162
AFOSR 196

Unclassified report

Pub. in Acta Chemica Scandinavica v15 n2 p393-402 1961 (Copies available only to DDC users).

Descriptors: (*Hydrolysis, Metals), (*Mercury compounds, Solubility), (*Solubility, Test equipment), Laboratory equipment, Design, Ions, Oxides, Sodium compounds, Perchlorates, Tracer studies, Radiochemistry, Chemical equilibrium, Hydroxides, Sweden.

A scaled-down version of a conventional solubility column which uses only about 2 g of solid material is described. It is well-adapted for handling radioactive materials, and was used for radiochemical measurements of the solubility of red mercury (II) oxide in 3 M NaC1O4 solutions in the pH range 1-5. The presence of Hg(2+), HgOH(+), and Hg(OH)2 as the only mercury containing species was confirmed, and the values for the equilibrium constants were calculated.

AD-611 299 Div. 4

Royal Inst. of Tech., Stockholm (Sweden).
STUDIES ON THE HYDROLYSIS OF METAL IONS. PART 34. THE HYDROLYSIS OF THE INDIUM(III)ION, IN(3+), IN 3 M (Na(+)) Cl (-)MEDIUM,
by George Biedermann, Norman C. Li, and Judy Yu. 14 Nov 60, 10p Technical note no. TN-10
Contract AF61 052 162
AFOSR 197

Unclassified report

Pub. in Acta Chemica Scandinavica (Denmark) v15 n3 p555-64 1961 (Copies available only to DDC users).
Prepared in cooperation with Duquesne Univ., Pittsburgh, Pa.
See also AD-611-298.

Descriptors: (*Hydrolysis, Metals), (*Indium, Hydrolysis), Chemical equilibrium, Hydroxides, Sodium compounds, Chlorides, Ions, Complex compounds, Sweden.

The hydrolysis equilibria of In(III) were studied at 25C in the ionic medium 3 M(Na(+)Cl(-) by measuring the hydrogen ion concentration with a glass electrode. The (In(III)) ranged from 0.001 to 0.04 M, and the hydrogen ion concentration was varied from values high enough for the hydrolysis to be negligible to those low enough for a precipitate to be formed. Comparison with the equilibrium constants for the formation of the species InOH(2+) and In(OH)2(4+) in 3 M(Na(+))Cl4(-) indicates that in 3 M (Na(+)Cl(-) medium the species denoted by the collective formulas 'InOH(2+)' and In(OH)2(4+) are in reality mainly mixed Cl(-)-OH(-) complexes (just as 'In(3+)' denotes mainly Cl(-) complexes). (Author)

AD-611 300 Div. 4

Royal Inst. of Tech., Stockholm (Sweden).
STUDIES ON THE HYDROLYSIS OF METAL IONS. PART 35. THE HYDROLYSIS OF THE LANTHANUM ION, La(3+),
by George Biedermann and Liberato Ciavatta. 4 Jan 61, 20p Technical note no. TN-12
Contract AF61 052 162
AFOSR 198

Unclassified report

Pub. in Acta Chemica Scandinavica (Denmark) v15 n6 p1347-66 1961 (Copies available only to DDC users).
Descriptors: (*Hydrolysis, Metals), (*Lanthanum, Hydrolysis), Chemical equilibrium, Ions, Hydroxides, Lithium compounds, Perchlorates, pH, Sweden.

The hydrolysis equilibria of the La(III) ion have been studied at 25C by hydrogen ion concentration measurements, using a glass electrode. The total (La(III)) was varied between 0.1 and 1.0 M, whilst the concentration of the ClO4(-) ion was held constant at 3 M by the addition of LiClO4. The experimental conditions necessary for accurate results to be obtained, when the hydrolysis equilibria must be studied in poorly buffered solutions, are discussed in some detail.

AD-611 343 Div. 4

California Univ., Berkeley.
ACIDITY OF HYDROCARBONS. VII. RATES OF EXCHANGE OF POLYCYCLIC METHYLARENE-ALPHA'S WITH LITHIUM CYCLOHEXYLAMIDE,
by A. Streitwieser, Jr. and W. C. Langworthy.
22 Dec 62, 5p
Grant AF AFOSR62 175, Contract AF49 638 105
AFOSR 65-0222

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v85 p1757-61 1963 (Copies not available to DDC or Clearinghouse customers).
See also AD-611 353.

Descriptors: (*Hyrocarbons, pH), (*Aromatic compounds, Exchange reactions), (*Polycyclic compounds, Exchange reactions), (*Cyclohexanes, Exchange reactions). (*Exchange reactions, Reaction kinetics), Lithium compounds, Amides, Metalorganic compounds, Protons, Chemical Equilibrium, Deuterated compounds, Ions, Stability.

Rates of exchange are reported for various deuteriomethyl derivatives of naphthalene, phenanthrene, anthracene, pyrene and fluoranthene with lithium cyclohexylamide in cyclohexylamine at 49.9. The relative rates are discussed with reference to the stabilities of corresponding arylmethyl anions and are compared with those of related carbonium ion reactions. (Author)

AD-611 346 Div. 4, 7

Catholic Univ. of America, Washington, D. C.
THE TRANSMISSION OF ELECTROLYTICALLY DEPOSITED HYDROGEN THROUGH A PALLADIUM MEMBRANE ELECTRODE. II. EXPERIMENTAL. OXIDIZING AGENTS AND HYDROGEN GAS ON THE EXIT SIDE.
Doctoral thesis (revised ed.),
by Richard A. laPietra and Gilbert W. Castellan.
4 Feb 64, 5p
Contract AF49 638 475
AFOSR 65-0233

Unclassified report

Pub. in Electrochemical Society. Journal (U. S.) v111 n11 Nov 1964 (Copies not available to DDC or Clearinghouse customers).
Revision of rept. dated 31 May 63.
Presented at the Los Angeles Meeting, 6-10 May 62.

Descriptors: (*Hydrogen, Electrochemistry), (*Electrodes, Transport properties), (*Palladium, Electrodes), Electrodeposition, Membranes, Cathodes (Electrolytic cells), Cerium compounds, Sulfates, Reduction (Chemistry), Volumetric analysis, Diffusion, Fuel cells.

Hydrogen was deposited electrolytically on one side (the entrance side) of a palladium membrane at a rate-i (amp/sq. cm.). The amount of hydrogen transmitted was measured by noting the change in normality of a solution of a strong oxidizing agent, e.g., Ce(+4) or S2O8(=), on the other side (the exit side), and in other experiments by measuring the hydrogen evolved on the exit side volumetrically. The results with hydrogen on the exit side are apparently capable of description by the equations developed in Part I of this series, but the value of the diffusion coefficient obtained is lower than Barrer's value at 25C by a factor of two to three. Possible reasons for this discrepancy are discussed briefly. (Author)

AD-611 348 Div. 4

California Univ., Berkeley.
PARTIAL RATE FACTORS FOR NITRATION OF FLUORANTHENE,
by A. Streitwieser, Jr. and R. C. Fahey. 14 Feb 62, 4p
Contract AF49 638 105
AFOSR 65-0215

Unclassified report

Pub. in Journal of Organic Chemistry (U. S.) v27 p2352-55 1962 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Polycyclic compounds, Nitration), (*Nitration, Reaction kinetics), Aromatic compounds, Molecular isomerism, Organic solvents, Substitution reactions, Atomic orbitals.

Nitration of fluoranthene gave the following partial rate factors relative to a 1-naphthalene position: in acetic anhydride at 0C: 1,0.7; 3,2.9; 7,1.2; 8,1.8; in acetic at 50C: 1,0.3; 3,6.1; 7,0.6; 8,2.7. The 7-mononitro isomer was obtained for the first time.

AD-611 349 Div. 4

California Univ., Berkeley.
ACIDITY OF HYDROCARBONS. I. KINETICS OF EXCHANGE OF TOLUENE-ALPHA-d WITH LITHIUM CYCLOHEXYLAMIDE,
by A. Streitwieser, Jr., D. E. Van Sickle, and W. C. Langworthy. 21 Jun 61, 5p

Contract AF49 638 105
AFOSR 65-0216

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v84 p244-48 1962 (Copies not available to DDC or Clearinghouse customers).
Presented in part at the National Organic Symposium of the American Chemical Society (16th) Seattle, Wash., Jun 59.

Descriptors: (*Hydrocarbons, pH), (*Aromatic compounds, Exchange reactions), (*Cyclohexanes, Exchange reactions), (*Exchange reactions, Reaction kinetics), Lithium compounds, Amides, Metalorganic compounds, Chemical equilibrium, Protons, Deuterated compounds.

The kinetics of the proton exchange reaction between toluene-alpha-d and lithium cyclohexylamide in cyclohexylamine were studied at 50. The reaction is first order each in toluene-alpha-d and in monomeric lithium cyclohexylamide. Free ions are apparently not involved to a significant extent in the concentration range studied. Lithium cyclohexylamide appears to be in equilibrium with relatively inert dimers, trimers, etc. (Author)

AD-611 350 Div. 4

California Univ., Berkeley.
ACIDITY OF HYDROCARBONS. II. EFFECT OF METHYL SUBSTITUENTS IN THE EXCHANGE REACTION OF TOLUENE-ALPHA-d WITH LITHIUM CYCLOHEXYLAMIDE,
by A. Streitwieser, Jr. and D. E. van Sickle.
21 Jun 61, 2p
Contract AF49 638 105
AFOSR 65-0217

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v84 p249 1962 (Copies not available to DDC or Clearinghouse customers).
Presented in part at the National Organic Symposium of the American Chemical Society (16th), Seattle, Wash., Jun 59.
See also AD-611 349.

Descriptors: (*Hydrocarbons, pH), (*Aromatic compounds, Exchange reactions), (*Cyclohexanes, Exchange reactions), (*Exchange reactions, Reaction kinetics), Lithium compounds, Amides, Xylenes, Metalorganic compounds, Protons, Deuterated compounds, Chemical equilibrium.

The rates of exchange of several deuterated hydrocarbons with lithium cyclohexylamine in cyclohexylamine at 49 9C give the following relative rates: toluene-alpha, 1.00; m-xylene-alpha-d, 0.60; p-xylene-alpha-d 0.29; ethylbenzene alpha-d, 0.116, toluene-alpha-d, 0.0079. Because of the electron-donating character of methyl substituents, these results indicate a highly carbanionic transition state and provide evidence that such exchange rates are valid measures of the relative acidities of hydrocarbons. (Author)

AD-611 351 Div. 4

California Univ., Berkeley.
ACIDITY OF HYDROCARBONS. III. PRIMARY ISOTOPE EFFECTS IN THE PROTON EXCHANGE OF TOLUENE AND ETHYLBENZENE WITH LITHIUM CYCLOHEXYLAMIDE,
by A. Streitwieser, Jr., W. C. Langworthy, and D. E. van Sickle. 21 Jun 61, 4p

Contract AF49 638 105
AFOSR 65 0218

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v84 p251 1962 (Copies not available to DDC or Clearinghouse customers).
Presented in part at the National Organic Symposium of the American Chemical Society (16th), Seattle, Wash., Jun 59.
See also AD-611 350.

Descriptors: (*Hydrocarbons, pH), (*Aromatic compounds, Exchange reations), (*Cyclohexanes, Exchange reactions), (*Exchange reactions, Reaction kinetics), Lithium compounds, Amides, Metalorganic compounds, Protons, Chemical equilibrium, Isotopes, Deuterated compounds, Chemical bonds.

Primary isotope effects were determined for the proton exchange reactions of toluene-alpha-d and -alpha-t and of ethylbenzene-alpha-d and -alpha-t with lithium cyclohexylamine. The kD/kT values average 3.0 ± 0.2, a rather high value that corresponds to kH/kD = 12. This high isotope effect is shown to rule out a one-step mechanism for the exchange and to implicate relatively stable intermediates of the carbanion type. (Author)

AD-611 352 Div. 4

California Univ., Berkeley.
ACIDITY OF HYDROCARBONS. IV. SECONDARY DEUTERIUM ISOTOPE EFFECTS IN EXCHANGE REACTIONS OF TOLUENE AND ETHYLBENZENE WITH LITHIUM CYCLOHEXYLAMIDE,
by A. Streitwieser, Jr. and D. E. van Sickle.
21 Jun 61, 5p
Contract AF49 638 105
AFOSR 65 0219

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v84 p254 1962 (Copies not available to DDC or Clearinghouse customers).
Presented in part at the National Organic Symposium of the American Chemical Society (16th), Seattle, Wash., Jun 59.
See also AD-611 351.

Descriptors: (*Hydrocarbons, pH), (*Aromatic compounds, Exchange reactions), (*Cyclohexanes, Exchange reactions), (*Exchange reactions, Reaction kinetics), Lithium compounds, Amides, Metalorganic compounds, Protons, Chemical equilibrium, Isotopes, Deuterated compounds, Chemical bonds.

Some secondary deuterium isotope effects were studied in the exchange reactions of hydrocarbons with lithium cyclohexylamide in cyclohexylamine; k(C6H5CHDCH3)/k(C6H5-CHDCD3) = 1.11 ± 0.03, a result that is interpreted to indicate that the transition state has substantial carbanionic character. 3k(C6H5CH2D)/k(C6H5CD3) = 1.31; analysis of this result suggests that the leaving deuterium and perhaps a lithium are close to the central carbon at the transition state. (Author)

AD-611 353 Div. 4

California Univ., Berkeley.
ACIDITY OF HYDROCARBONS. V. STEREOCHEMISTRY AND MECHANISM OF THE PROTON EXCHANGE REACTIONS OF HYDROCARBONS IN CYCLOHEXYLAMINE,
by A. Streitwieser, Jr., D. E. van Sickle, and L. Reif. 21 Jun 61, 3p

Contract AF49 638 105
AFOSR 65-0220

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v84 p258-60 1962 (Copies not available to DDC or Clearinghouse customers).
See also AD-611 352.

Descriptors: (*Hydrocarbons, pH), (*Aromatic compounds, Exchange reactions), (*Cyclohexanes, Exchange reactions), (*Exchange reactions, Stereochemistry), (*Stereochemistry, Exchange reactions), Lithium compounds, Amides, Metalorganic compounds, Protons, Chemical equilibrium, Molecular rotation, Deuterated compounds, Chemical bonds, Reaction kinetics.

The rate of racemization of optically active ethylbenzene-alpha-d with lithium cyclohexylamide in cyclohexylamine at 49.9C is 2.8 times the loss of deuterium. This result is analyzed to show that replacement of the alpha-hydrogen by hydrogen in this system proceeds with 82% net retention of configuration. A mechanism of the exchange reaction is proposed which involves a four-membered ring transition state in which specific asymmetric solvation by individual solvent molecules is not necessary to accommodate the results. (Author)

AD-611 365 Div. 4, 14, 25
CFSTI Prices: HC$1.00 MF$0.50

Brussels Free Univ. (Belgium).
VAPORIZATION OF COMPOUNDS AND ALLOYS AT HIGH TEMPERATURES. PART XXV. MASS SPECTROMETRIC STUDY OF THE VAPORIZATION OF THE TIN OXIDES THE DISSOCIATION ENERGY OF SnO,
by R. Colin, J. Drowart, and G. Verhaegen. Jan 65, 23p
Contract AF61 052 764, Proj. 7350, Task 735001
WADD TR-60-782 P25

Unclassified report

See also AD-607 780.

Descriptors: (*Vaporization, Thermochemistry), (*Tin compounds, Oxides), (*Oxides, Dissociation), (*Mass spectroscopy, Tin compounds), Vapor pressure, Thermodynamics, Tin, High-temperature research, Tables, Belgium.

The evaporation of tin oxide SnO2 and mixtures of tin and tin oxide was studied. The vaporization reactions are SnO2: 1/n(SnO)n + 1/2 O2, (n= 1,2); and Sn + SnO2: 1/n(SnO)n, (n=1,2,3,4). The dissociation energy of SnO and the polymerization energies for (SnO)2, (SnO)3 and (SnO)4 are given. A reinterpretation of the total vapor pressures given in the literature was made. (Author)

AD-611 382 Div. 4

Milan Univ. (Italy).
HYDRIDO-COMPLEXES OF TRANSITION METALS. PART I. HYDRIDO-COMPLEXES OF RHODIUM(I), COBALT(I), AND COBALT(III),
by A. Sacco and R. Ugo. 29 Jul 63, 6p
Grant AF EOAR64 9
AFOSR 65 0237

Unclassified report

Pub. in Chemical Society. Journal (Gt. Brit.) p3274-78 Sep 1964 (Copies available to DDC users).

Descriptors: (*Rhodium compounds, Complex compounds), (*Cobalt compounds, Complex compounds), (*Complex compounds, Hydrides), Synthesis (Chemistry), Chemical properties, Transition metals, Phosphines, Perchlorates, Reduction (Chemistry), Molecular structure, Spectra (Infrared), Nuclear magnetic resonance, Dipole moments, Italy.

The preparation and properties are described of complex-salts of rhodium(I), (Rh(C2H4(PPh2)2)2)X (X = Cl, ClO4, BPh4). From these compounds, a very stable hydrido-complex of rhodium(I), (RhH(C2H4(PPh2)2)2), was prepared by reduction with lithium aluminium hydride or sodium borohydride. The product of the reaction between (CoBr2(C2H4(PP2)2)2) and sodium borohydride, previously described as a derivative of cobalt(0), is shown to be a hydrido-complex of cobalt(I), (CoH(C2H4(PPh2)2)2). This formula is supported by the diamagnetism of the compound, by its infrared spectrum, and by its reaction with carbon tetrachloride to give chloroform. On the grounds of their dipole moments (ca.3-4D) and of their isomorphism with (Ni(C2H4(PPh2)2)2), a non-orthogonal structure for these hydrido-complexes of rhodium and cobalt is suggested. The hydrido-complexes of cobalt(I) behaves like a Lewis base, giving with perchloric acid the hydrido-complexes (CoH2(C2H4(PPh2)2)2)ClO4. (Author)

AD-611 383 Div. 4

Milan Univ. (Italy).
BASIC BEHAVIOUR OF SOME PLATINUM (O) DERIVATIVES,
by F. Cariati, R. Ugo, and F. Bonati. 1 Jul 64, 1p
Grant AF EOAR64 9
AFOSR 65-0238

Unclassified report

Pub. in Chemistry and Industry (Gt. Brit.) p1714-15 1964 (Copies available only to DDC users).

Descriptors: (*Platinum compounds, Chemical reactions), Hydrides, Valence, Acids, Transition elements, Arsenic compounds, Complex compounds, Phosphines, Electrical conductance, Italy.

Zerovalent Pt derivatives of PtL3 general formula (L = P Ph3 or As Ph3) 3 have been found to have basic behavior analogous to the reaction of some transition metal complexes, such as the reversible reactions of ((pi-C5H5)2 Re H)1 or (Fe(CO)3(P Ph3)2)2 with acids to give hydrides.

AD-611 386 Div. 4

Oregon Univ., Eugene.
CHROMATOGRAPHIC ADSORPTION OF AZOBENZENES AND AROMATIC NITROGEN HETEROCYCLES ON ALUMINA. STUDIES WITH ALUMINA-IMPREGNATED GLASS PAPER,
by L. H. Klemm, E. P. Antoniades, Grayson Capp, Eva Chiang, and E. Y. K. Mak. 30 Jan 61, 10p
Contract AF49 638 473
AFOSR 221

Unclassified report

Pub. in Journal of Chromatography (Netherlands) v6 p420-28 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Polycyclic compounds, Chromatographic analysis), (*N-heterocyclic compounds, Chromatographic analysis), (*Organic nitrogen compounds, Chromatographic analysis), (*Chromatographic analysis, Adsorption), Glass textiles, Paper, Aluminum compounds, Oxides, Chemical bonds, Atomic orbitals, Molecular isomerism, Complex compounds, Quantitative analysis.

A semi-quantitative method is described for chromatography of fluorescent polynuclear aromatic hydrocarbons and aromatic nitrogen heterocycles on alumina-impregnated glass paper. Combining data obtained from such papers with those from alumina columns it is noted that the isomeric azobenzenes and nitrogen heterocycles are more strongly adsorbed than their hydrocarbon analogs (where CH replaces N). It is proposed that adsorption of such nitrogen compounds occurs preferentially by means of the electron pairs on the nitrogen atoms to form n-complexes. If steric hindrance to n-complexation is too great the substrate may form a pi-complex or a pi, n-hybrid complex instead. (Author)

AD-611 387 Div. 4

Purdue Univ., Lafayette, Ind.
THE STEREOCHEMISTRY OF THE NUCLEOPHILIC ADDITION OF p-TOLUENETHIOL TO 1-p-TOLYLSULFONYL CYCLOHEXENE,
by William E. Truce and Alan J. Levy. 28 Jul 61, 3p
Contract AF49 638 531
AFOSR 2038

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v83 p4641-43 Nov 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Organic sulfur compounds, Stereochemistry), (*Thiols, Stereochemistry), (*Cyclohexenes, Stereochemistry), (*Stereochemistry, Organic sulfur compounds), Chemical reactions, Molecular isomerism, Chemical bonds, Synthesis (Chemistry), Nuclear magnetic resonance.

p-Toluenethiol adds to 1-p-tolylsulfonyl-cyclohexene, under mildly basic conditions, in a trans manner giving cis-2-p-tolylmercapto-1-p-tolylsulfonylcyclohexane. The stereochemistry of the adduct was confirmed by independent synthesis and supported by n.m.r. spectra. A mechanism for the addition is proposed and evidence presented to support it. (Author)

AD-611 388 Div. 4

Purdue Univ., Lafayette, Ind.
THE STEREOCHEMISTRY OF THE ADDITION OF MESITY-LENETHIOL TO MESITYLACETYLENE,
by William E. Truce, Harvey G. Klein, and Robert B. Kruse. 24 May 61, 6p
Contract AF49 638 531; Grant NIH CY4536
AFOSR 2039

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v83 p4636-41 Nov 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Organic sulfur compounds, Stereochemistry), (*Thiols, Stereochemistry), (*Stereochemistry, Organic sulfur compounds), Chemical reactions, Molecular isomerism, Chemical bonds, Synthesis (Chemistry), Nuclear magnetic resonance, Spectra (Infrared).

The addition of mesitylenethiol to mesitylacetylene under basic and non-basic conditions proceeds trans. The configurational assignments to the adduct and its sulfone derivative are based on n.m.r., infrared and chemical evidence. (Author)

AD-611 389 Div. 4

Tufts Univ., Medford, Mass.
PYROLYSIS OF ALLYLIC ACETATES,
by Fred L. Greenwood. 31 Jan 62, 4p
Contract AF49 638 292
AFOSR 2120

Unclassified report

Pub. in Journal of Organic Chemistry (U. S.) v27 p2308-11 Jul 1962 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Acetates, Pyrolysis), (*Pyrolysis, Stereochemistry), (*Stereochemistry, Acetates), Esters, Molecular isomerism, Chemical bonds, Aliphatic compounds, Synthesis (Chemistry).

2-Acetoxy-trans-3-hexene and 4-acetoxy-trans-2-hexene were pyrolyzed under conditions that gave partial pyrolysis. Both esters gave rise to a mixture of 1,3-and 2,4-hexadiene, the 2-acetoxy compound giving somewhat more of the 1,3-diene and the 4-acetoxy compound giving more of the 2,4-diene. The 1,3-diene was predominantly the trans isomer, and about half of the 2,4-diene was the trans, trans isomer. The unpyrolyzed ester recovered in each case was the same mixture of 2-acetoxy and 4-acetoxy compounds. Clearly, the esters underwent isomerization during the pyrolysis, and in this isomerization the trans-alkene configuration was essentially retained. (Author)

AD-611 390 Div. 4

Washington Univ., St. Louis, Mo.
ASSOCIATION BETWEEN SODIUM AND NAPHTHALENIDE IONS,
by N. M. Atherton and S. I. Weissman.
10 Oct 60, 7p Technical rept. no. TR-35
Contract AF49 638 464, Proj. 9751
AFOSR TN-60-1230

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v83 p1330-4 Mar 20 1961 (Copies not available to DDC or Clearinghouse customers).
Research supported in part by the U. S. Office of Naval Research.

Descriptors: (*Aromatic compounds, Nuclear magnetic resonance), (*Sodium compounds, Aromatic compounds), Nuclear spins, Absorption spectrum, Hyperfine structure, Organic solvents, Quantum mechanics, Atomic orbitals, Chemical bonds.

The electron spin resonance spectrum of the naphthalene negative ion in dimethoxyethane was observed under very high resolution and improved values of the hyperfine coupling constants evaluated. It was established that the more complex spectrum of the sodium derivative observed in tetrahydrofuran solution can be attributed to interaction with the sodium nucleus of spin 3/2. The sodium splitting is observed to be temperature dependent, and the existence of an ion-ion pair equilibrium is demonstrated. Sodium splittings were also measured in 2-methyltetrahydrofuran, tetrahydropyran and dioxane. Suggestions are made concerning a possible structure of the ion pair and the mechanism yielding spin density at the sodium nucleus. (Author)

AD-611 391 Div. 4

Washington Univ., St. Louis, Mo.
NOTE ON MEASUREMENTS OF RATES OF ELECTRON TRANSFER PROCESSES BY BROADENING OF ESR LINES,
by P. J. Zandstra and S. I. Weissman.
26 Apr 61, 2p Technical rept. no. TR-38

Contract AF49 638 464, Proj. 9751
AFOSR TN-617

Unclassified report

Pub. in Journal of Chemical Physics (U. S.) v35 n2 p757 Aug 1961 (Copies not available to DDC or Clearinghouse customers).
Research supported in part by the U. S. Office of Naval Research.

Descriptors: (*Aromatic compounds, Nuclear magnetic resonance), (*Nuclear magnetic resonance, Line spectrum), (*Line spectrum, Aromatic compounds), Nuclear spins, Absorption spectrum, Electrons, Exchange reactions, Magnetic fields.

Measurements were made of the relative broadenings of several of the ESR lines of naphthalene negative ion in the presence of naphthalene. The results imply that the electron exchange rate does not depend on nuclear spin states and that the magnetic pulses during transit do not contribute to line breadth.

AD-611 395 Div. 4
CFSTI Prices: HC$2.00 MF$0.50

Southwest Research Inst., San Antonio, Tex.
MIXED ACIDS ANALYSIS BY NMR.
Rept. no. 10, 1-31 Oct 63,
by William H. Storey, Jr. 31 Oct 63, 26p
Contract DA23 072AMC45A

Unclassified report

See also AD-606 775.

Descriptors: (*Nitric acid, Nuclear spectroscopy), (*Nuclear spectroscopy, Nuclear magnetic resonance), Inorganic acids, Nitration, Chemical analysis, Protons, Nitrogen, Isotopes, Nuclear spins, Intensity, Measurement, Temperature, Nitrogen compounds, Oxides, Sulfuric acid.

Temperature dependence data were completed and are included in this report. Wet chemical analysis of the eight samples received from Radford (R1-R8) was completed with satisfactory precision and the results are presented. The bulk of the effort was directed toward improving instrumentation presently on hand to achieve the required 1% accuracy in N14 intensity measurements. Based upon 23 measurements of R8, a standard deviation of 3.9% has been obtained; but there has been an apparent improvement in the procedure for obtaining the integrals since then, and the data given in this report are considered to demonstrate the resulting improvement in accuracy. The N14 signal intensities from samples R1, R2, R7, and R8 were compared, and the ratios may be interpreted as supporting the viewpoint that total nitrogen (HNO3 + oxides) is being measured.

AD-611 449 Div. 4

Sterling Chemistry Lab., Yale Univ., New Haven, Conn.
THE KINETICS OF THE THERMAL CIS-TRANS ISOMERIZATION OF 2-METHYL(2.1.0) BICYCLOPENTANE,
by John P. Chesick. 30 Jan 62, 5p
Contract AF49 638 722
AFOSR 3890

Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v84 p3250-53 Sep 5, 1962 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Thermochemistry, Reaction kinetics), (*Cyclopentanes, Stereochemistry), (*Stereochemistry, Cyclopentanes), Molecular isomerism, Chemical equilibrium, Chemical bonds, Pressure.

The kinetics of the reversible cis-trans isomerization reaction of 2-methyl(2.1.0) bicyclopentane were studied between 203.3 and 231.7C and at reactant pressures between 0.08 and 1.7 mm. If the lower boiling isomer is tentatively identified as trans, then K = k-trans/cis = 0.58 at 220 degrees for the trans to cis reaction. The transition state is concluded to be one of incomplete rupture of the bridgehead-bridgehead bond corresponding to considerable residual bicyclic strain energy. The first order rate constants decreased less than 10% on lowering the reactant pressure to 0.1 mm. (Author)

AD-611 450 Div. 4

Sterling Chemistry Lab., Yale Univ., New Haven, Conn.
THE KINETICS OF THE THERMAL DECOMPOSITION OF (2,2,1) BICYCLOHEPTADIENE,
by John H. Birely and John P. Chesick. 13 Oct 61, 4p
Contract AF49 638 722
AFOSR 1553

Unclassified report

Pub. in Journal of Physical Chemistry (U. S.) v66 p568-70 1962 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Thermochemistry, Reaction kinetics), (*Hydrocarbons, Pyrolysis), (*Pyrolysis, Reaction kinetics), Chemical bonds, Diene synthesis, Heat of reaction, Heat of activation, Decomposition, Molecular isomerism.

AD-611 451 Div. 4

Sterling Chemistry Lab., Yale Univ., New Haven, Conn.
THE KINETICS OF THE THERMAL DECOMPOSITION OF METHYLENECYCLOBUTANE,
by John P. Chesick. 13 Jun 61, 5p
Contract AF49 638 722
AFOSR 974

Unclassified report

Pub. in Journal of Physical Chemistry (U. S.) v65 p2170-73 Dec 1961 (Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Thermochemistry, Reaction kinetics), (*Cyclobutanes, Pyrolysis), (*Pyrolysis, Reaction kinetics), Alkenes, Chemical bonds, Pressure, Decomposition, Heat of activation, Molecular isomerism.

Methylenecyclobutane undergoes a homogeneous thermal decomposition to allene and ethylene. This reaction was studied in the gas phase by static methods from 430 to 470C over a pressure of 0.1 to 25 mm. The reaction is first order with a high pressure rate constant k = 4.76 x 10 to the 15th power exp. (-63.3 kcal./RT)/sec. At low pressures the rate decreases as predicted for unimolecular reactions in pressure regions where collisional activation starts to become rate controlling. Added nitrogen has the effect of increasing the rate in the low pressure region. (Author)

AD-611 452 Div. 4

Sterling Chemistry Lab., Yale Univ., New Haven, Conn.
THE KINETICS OF THERMAL ISOMERIZATION OF (2.1.0) BICYCLOPENTANE,

by Marcel L. Halberstadt and John P. Chesick.
15 Jan 62, 5p
Contract AF49 638 722 Unclassified report
AFOSR 2156
Pub. in American Chemical Society. Journal (U. S.) v84 p2688-2691 Jul 20 1962 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Thermochemistry, Reaction kinetics), (*Cyclopentanes, Stereochemistry), (*Stereochemistry, Cyclopentanes), Molecular isomerism, Chemical bonds, Pressure, Integrals, Chemical equilibrium.

The thermal isomerization of (2.1.0) bicylopentane is a homogeneous unimolecular reaction and was studied in the range 287.9 to 310.1C and pressures of 66.7 to 0.04 mm. The number of effective oscillators in the Kassel integral is estimated as 18 ± 2. Added nitrogen increases the rate in the lower pressure region with a pressure efficiency relative to the reactant molecule of 0.10 ± 0.02. Energy considerations appear to preclude a cyclic strain-free diradical as a transition state. (Author)

AD-611 453 Div. 4

McMaster Univ., Hamilton (Ontario).
THE 19F N. M. R. SPECTRUM OF IF7,
by R. J. Gillespie and J. W. Quail. 8 Jul 64, 4p
Contract AF AFOSR516 64
AFOSR 65 0230
Unclassified report

Pub. in Canadian Journal of Chemistry. v 42 p2671-73 1964 (Copies available only to DDC users).

Descriptors: (*Nuclear magnetic resonance, Halogen compounds), (*Halogen compounds, Nuclear magnetic resonance), Nuclear spins, Nuclear spectroscopy, Fluorides, Iodine compounds, Nuclear magnetic moments, Canada.

J(IF) equals approximately 2100 c/s. It is shown that the line shape calculated for the n.m.r. spectrum of a magnetic nucleus attached to a nucleus of spin 5/2 undergoing quadrupole relaxation agrees well with the observed spectrum of iodine heptafluoride. The iodine-fluorine coupling constant was found to be·J(IF) equals approximately 2 100 c/s. The apparent magnetic equivalence of the fluorine atoms in IF7 is discussed. (Author)

AD-611 455 Div. 4

California Univ., Berkeley.
ACIDITY OF HYDROCARBONS. VIII. AN HMO EXAMINATION OF EXCHANGE RATES OF METHYLARENE-ALPHA-d's WITH LITHIUM CYCLOHEXYLAMIDE,
by A. Streitwieser, Jr., W. C. Langworthy, and J. I. Brauman. 22 Dec 62, 3p
Contract AF49 638 105; Grant AF AFOSR62 175
AFOSR 65-0223
Unclassified report

Pub. in American Chemical Society. Journal (U. S.) v85 p1761-63 Jun 20 1963 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hydrocarbons, pH), (*Cyclohexanes, Exchange reactions), (*Aromatic compounds, Exchange reactions), (*Exchange reactions, Reaction kinetics), Polycyclic compounds, Chemical bonds, Atomic orbitals, Molecular structure, Ions, Lithium compounds, Amides.

The Huckel Molecular Orbital method is shown to provide a fair correlation of the experimental results reported in AD-611 343. Application of MO theory suggests that the McEwen scale of hydrocarbon acidities is seriously compressed and new values are tentatively assigned. (Author)

AD-611 460 Div. 4, 7

Catholic Univ. of America, Washington, D. C.
THE TRANSMISSION OF ELECTROLYTICALLY DEPOSITED HYDROGEN THROUGH A PALLADIUM MEMBRANE ELECTRODE. III. PRESSURE AND TEMPERATURE DEPENDENCE.
Revised ed.,
by Paul L. Damour and Gilbert Castellan.
4 Feb 64, 5p
Contract AF49 638 475
AFOSR 65-0234
Unclassified report

Pub. in Electrochemical Society. Journal (U. S.) v111 n11 p1280-83 Nov 1964 (Copies not available to DDC or Clearinghouse customers)
Revision of rept. dated 31 May 63.
See also AD-611 346.

Descriptors: (*Hydrogen, Electrochemistry), (*Electrodes. Transport properties), (*Palladium, Electrodes), Electrodeposition, Cathodes (Electrolytic cells), Membranes, Thickness, Pressure, Temperature, Penetration, Electric currents, Fuel cells.

An investigation of the pressure and temperature dependence of the maximum rate of transmission of hydrogen through palladium is described. The pressure dependence in the range from 0.329 to 1 atm indicates that the penetration-exit reaction, H(ads) = H(bulk), is the slowest surface reaction, but is nonetheless very fast having an exchange current density of about 0.8 amp/sq. cm at 1 atm pressure. From the temperature dependence it is found that at temperatures slightly below room temperature the diffusion coefficient can be represented by D = 0.0260 exp (-6800/RT) sq. cm/sec. (Author)

AD-611 461 Div. 4, 7

Catholic Univ. of America, Washington, D. C.
THE TRANSMISSION OF ELECTROLYTICALLY DEPOSITED HYDROGEN THROUGH A PALLADIUM MEMBRANE ELECTRODE. I. THE RATE EQUATIONS.
Revised ed.,
by Gilbert W. Castellan. 4 Feb 64, 4p
Coptract AF49 638 475 Unclassified report
AFOSR 65-0232
Pub. in Electrochemical Society. Journal (U. S.) v111 n11 p1273-76 Nov 1964 (Copies not available to DDC or Clearinghouse customers)
Revision of report dated 31 May 63.

Descriptors: (*Hydrogen, Electrochemistry), (*Electrodes, Transport properties), (*Palladium, Electrodes), Electrodeposition, Membranes, Cathodes (Electrolytic cells), Reaction kinetics, Equations, Cerium compounds, Sulfates, Sulfuric acid, Chemical equilibrium, Electric currents, Polarization, Fuel cells.

A sequence of elementary steps is postulated to describe the transport of hydrogen through a palladium membrane electrode. The amount of hydrogen transmitted per square centimeter of the membrane is described by a current density, -j, while the rate of deposition of hydrogen per square centimeter is described by a polarization current density, -i. It is shown in general, without reference to the particular mechanism, that j is a linear function of i at low values of i, and that the derivative, (di/dj) sub i = 0, is a linear function of the membrane thickness L, provided only that Fick's law in simple form holds; the slope of the plot of (di/dj) sub i = 0 vs. L is independent of conditions on the exit side of the membrane. It is also shown in general that if conditions are the same on both sides of the membrane at equilibrium, no more than one-half of the hydrogen deposited can be transmitted. The postulated mechanism predicts that the rate of transmission should reach a limiting value, -j sub m, at high values of -i. For thin membranes, 1/(-j sub m) should be a linear function of L. (Author)

5. Communications

AD-610 993 Div. 5,1
CFSTI Prices: HC$1.00 MF$0.50

Federal Aviation Agency, Washington, D. C.
STUDY ON THE COST-BENEFITS OF RECORDING ON VOICE CHANNELS.
Final rept.,
by Raymond R. Barkalow. Dec 64, 22p
Rept. no. RD-64-159
Proj. 222 250 01C

Unclassified report

Descriptors: (*Voice communication systems, Magnetic recording systems), (*Magnetic recording systems, Economics), (*Air traffic control systems, Magnetic recording systems), Magnetic tape, Storage, Records, Costs, United States government, Air traffic, Aviation accidents.

The necessity of 30 day storage procedure for voice recording tape has been considered in an effort to save on the annual expenditure of funds. It has been concluded that a reduction in storage time to 15 days would be more than adequate to satisfy all recipients of voice recordings. Recommendations were made to change the procedure from 30-day to 15-day storage and for purposes of accident investigation, retain all tapes for that day on which the accident occurred. (Author)

AD-611 082 Div. 5, 28
CFSTI Prices: HC$2.00 MF$0.50

Bolt, Beranek and Newman, Inc., Cambridge, Mass.
SCIM: A METER FOR MEASURING THE PERFORMANCE OF SPEECH COMMUNICATION SYSTEMS.
Interim rept.,
by Karl D. Kryter and Jay H. Ball. Oct 64, 46p
Rept. no. BBN-1166
Contract AF19 628 2463, Proj. 2808, Task 280802
ESD TDR-64-674

Unclassified report

Descriptors: (*Voice communication systems, Speech transmission), (*Intelligibility, Voice communication systems), (*Speech transmission, Measuring devices (Electrical and electronic)), Psychoacoustics, Signal-to-noise ratio, Narrowband, Speech recognition, Tests, Signal generators, Performance (Engineering), Human engineering.

An electronic device called SCIM (Speech Communication Index Meter) was designed primarily in terms of the Articulation Index theory; however, SCIM accommodates additional factors affecting speech that are not involved in the original procedures for calculating AI. The SCIM signal generator generates a 3-second signal burst, which is fed to the electrical input of the system under test; within 12 seconds the SCIM analyzer, located at the receiving station, calculates and displays an index, ranging from .00 to .99, which reflects the ability of that system to transmit intelligible speech. Although devices based on similar principles have been previously developed, SCIM measures several parameters affecting the performance of a speech system differently than did previous instruments. SCIM was designed to be relatively small, have small power requirements, be capable of remote digital readout, and contain other features to make it suitable for field, fixed station or laboratory use. The results of SCIM measurements and actual speech intelligibility tests obtained from a variety of communication systems and operating conditions are presented.

AD-611 280 Div. 5, 8
CFSTI Prices: HC$3.00 MF$0.75

Naval Missile Center, Point Magu, Calif.
EXPERIMENTAL MODEL OF THE STOCHASTIC PROCESSES ASSOCIATED WITH AIR-TO-AIR COMMUNICATIONS OVER SEA WATER (VERTICAL POLARIZATION),
by Richard Lane. 18 Feb 65, 98p
Miscellaneous pub. no. NMC-MP-65-2

Unclassified report

Descriptors: (*Mathematical models, Communication systems), (*Communication systems, Air-to-air), (*Sea water, Electromagnetic wave reflections), (*Stochastic processes, Electromagnetic wave reflections), Polarization, Refractive index, Air, Electromagnetic waves, Propagation, Communication theory.

This paper considers the stochastic processes associated with air-to-air communications between high speed and high altitude aircraft or missiles. In this analysis, only the interaction of the field with the surface specifically sea water, was considered in detail because data were not available to study a particular stochastic process and also because some studies such as of the atmosphere have already been performed. Previous analyses of the surface have almost always considered the distribution of the surface irregularities as a function of space coordinates as the starting point of the study. In this analysis, the reflection coefficient instead of the surface irregularities is considered because the reflection coefficient is a parameter in the field equation and because it is anticipated that experimental data of the reflection coefficient can more easily be obtained than data on the surface irregularities. Further, the reflection coefficient is the terminal point of a compound stochastic process and hence by studying the reflection coefficient, the overall problem is simplified.

AD-611 293 Div. 5

Communication Sciences Lab., Univ. of Michigan, Ann Arbor.
THE MEASUREMENT OF SPEECH POWER,
by Gordon E. Peterson and Norris P. McKinney.
1960, 20p
Contract AF49 638 492
AFOSR 2095

Unclassified report

Pub. in Phonetica (Switzerland). v7 p65-84 1961
(Copies available only to DDC users).

Descriptors: (*Voice communication systems, Speech transmission), (*Speech recognition, Voice communication systems), Speech, Measurement, Speech representation, Auditory signals, Acoustics, Acoustic filters, Rectifiers, Circuits, Diodes.

The measurement of speech power is basic to research on the acoustic correlates of linguistic stress. Two units essential to speech power measurement are a rectifier and a filter. An amplitude compressor is also desirable. Theoretically a square-law rectifier is ideally suited for speech power measurements, but there are considerable practical difficulties in implementing such a circuit. The common 'linear rectifier' has been found experimentally to be suitable for this application. A simple filter design may be achieved which is adequate for most applications and which avoids the theoretical and practical difficulties of several other filter designs discussed. Logarithmic amplitude compression of the filter output is desirable and is easily accomplished with a diode. (Author)

AD-611 447 Div. 5, 1
CFSTI Prices: HC$2.00 MF$0.50

National Aviation Facilities Experimental Center, Atlantic City, N. J.
INTELLIGIBILITY TESTS OF AUTOMATIC BROADCASTS VS. LIVE MESSAGES.
Final rept.,
by Malcolm Y. McCormick and Kiriako Sarlanis.
Oct 64, 27p
Proj. 232 004 01R
FAA RD-64-122

Unclassified report

Descriptors: (*Voice communication systems, Tests), (*Intelligibility, Voice communication systems), (*Speech, Intelligibility), Sound reproduction systems, Automatic, Noise, Sound transmission, Speech representation, Command and control systems, Personnel, Vocabulary, Models (Simulations), Correlation techniques.

A variety of electro-mechanical means for automatic voice transmission are being explored. These devices range from the broadcasting of ordinary tape-recorded routine information through elaborately engineered apparatus that will accept and store digitally teletype reports and, at prescribed intervals, draw on a stored vocabulary to prepare a series of voice messages for audio transmission. The paper describes an attempt to compare the intelligibility of such an electro-mechanical device with the intelligibility of a 'live' communicator. Tapes were prepared with ten standard messages on each. The tape played for eight subjects had the first five messages recorded from a live communicator and the second five 'canned.' The other tape heard by eight additional subjects reversed the procedure with the previously live messages now heard canned and vice versa. Overall mean scores were 70 percent correct for canned messages and 76 percent correct for live. This difference is statistically significant. The preliminary model of an automatic communicator was found to be inferior in intelligibility. (Author)

6. Detection

AD-610 835 Div. 6, 12, 28
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
APPROPRIATE ROLES AND SOME LIMITATIONS OF MAN AS A GUIDANCE COMPONENT,
by H. H. Bailey. 14 Jun 60, 18p P-2020
Unclassified report

Presented at the National Meeting of the Institute of Aeronautical Sciences, San Diego, 1-3 Aug 60.

Descriptors: (*Terminal guidance, Target recognition), (*Target recognition, Terminal guidance), (*Performance (Human), Target recognition), Guided missiles, Weapon systems, Errors, Symposia.

AD-611 070 Div. 6
CFSTI Prices: HC$3.00 MF$0.75

Applied Physics Lab., Univ. of Washington, Seattle.
THE ST. CROIX THREE-DIMENSIONAL UNDERWATER TRACKING RANGE,
by J. E. Camp and R. W. Minto. 12 Dec 64, 92p
APL-UW-6421
Contract NOw62 0579d Unclassified report

Descriptors: (*Underwater tracking, Ranges (Establishments)), (*Acoustic ranges, Underwater tracking), (*Virgin Islands, Acoustic ranges), Underwater ordnance, Torpedo trajectories, Submarines, Targets, Hydrophones, Transducers.

Contents:
History
Dabob Bay
Chatham Strait
San Clemente Island
St. Croix, U. S. Virgin Islands
Principle of the Applied Physics Laboratory Three-Dimensional Range
The St. Croix Range
The St. Croix Area
St. Croix Range Facilities
Range Operations
Range Logistic Support
Range Management Control
Geodetic Control on St. Croix Island.

AD-611 241 Div. 6, 2
CFSTI Prices: HC$4.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
EARTH MOTION MEASUREMENTS.
by L. M. Swift, D. C. Sachs, and W. M. Wells. Jan 61, 109p
Proj. 26 1 Unclassified report
WT 1702
Rept. on Operation HARDTACK, Phase II; Apr-Oct 58.

Descriptors: (*Seismology, Underground explosions), (*Earth, Seismology), Nuclear explosions, Shock waves, Seismic waves, Lithosphere, Motion, Measurement, Recording systems, Experimental data, Graphics.

Several parameters of ground motion on two deep underground nuclear detonations (Evans and Blanca) are measured. Primary measurements included vertical acceleration and velocity in a deep hole over Evans zero, horizontal and vertical acceleration on the mesa surface, and horizontal surface strain. Additional data were obtained on vertical response spectra (reed gage), surface subsidence (liquid level), and aftershocks (geophone listening) (Report WT-1740). Despite the less than satisfactory over-all results, some conclusions can be drawn on the basis of the data obtained. Arrival time studies seem to confirm earlier indications of a high speed layer in the Area 12 mesa at 300-foot depth. This layer was found to preclude general conclusions as to propagation mechanism or amplitudes measured at the surface. Subsurface motions although very small were consistent with scaling methods applied to prediction of Hardtack-II events.

AD-611 266 Div. 6, 15
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
MORE ON DETECTION OF FLUCTUATING TARGETS,
by P. Swerling. Feb 65, 9p Rept. no. P-3037
Unclassified report

Descriptors: (*Radar targets, Detection), (*Radar tracking, Radar targets), (*Video integration, Radar signals), Radar pulses, Probability, Series, Signal-to-noise ratio, Statistical functions.

It is the purpose of this note to derive the characteristic function of the video integrator output (assuming pulsed waveforms) for completely arbitrary probability distribution functions of the signal fluctuations, and for completely arbitrary correlation properties; that is to say, for a completely arbitrary joint probability distribution of the individual pulse signal-to-noise ratios. (Subject, however, to the assumption that the signal amplitude and phase do not fluctuate within a single pulse.) The forms taken by this result will be exhibited in some special cases. A brief discussion will be given of computational schemes based on the characteristic functions thus obtained.

AD-611 425 Div. 6, 2, 8
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Lab., Corona, Calif.
OPERATION OF THE NOLC X-BAND RADIOMETER,
by M. C. Hoover. 1 Dec 64, 49p
Rept. no. NOLC-613
Task RMWC42 123 211 1F008 02 07 Unclassified report

Descriptors: (*Radiometers, Mapping), Microwave frequency, X-band, Operation, Calibration, Errors, Performance (Engineering), Magnetic recording systems.

This report describes the NOLC X-band mapping radiometer. All phases of the operation are discussed, and the methods used for calibration of the radiometer calibrate-temperature step are explained. An analysis of the system losses is presented, and the effect of these losses on the radiometer measurements is described. (Author)

AD-611 428 Div. 6
CFSTI Prices: HC$1.00 MF$0.50

David Taylor Model Basin, Washington, D. C.
ACCELERATION SENSITIVITIES OF HYDROPHONES.
Final rept.,
by James L. Clatterbuck and Fred Schloss.
Jan 65, 13p Rept. no. 1952
Proj. S F013 11 08, Task 01356 Unclassified report

Descriptors: (*Hydrophones, Calibration), Sensitivity, Vibration, Acceleration, Sonar equipment, Piezoelectric transducers, Pressure, Signals, Extremely low frequency.

A method was developed to determine the acceleration component of hydrophone outputs. A BQR 7 Sonar Hydrophone and other hydrophones were tested to establish a criterion by which hydrophones may be selected or specified on the basis of their sensitivity to acceleration. (Author)

7. Electrical Equipment

AD-611 077 Div. 7
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ELECTRICITY WITHOUT INTERMEDIARIES,
by V. A. Kirillin. 20 Jan 65. 9p FTD-TT-64-874
TT 65-61691 Unclassified report

Unedited rough draft trans. from Izvestiya (USSR) 1964, no. 76, 29 Mar, p. 5.

Descriptors: (*Generators, Magnetohydrodynamics), (*Magnetohydrodynamics, Generators), Electric power production, Energy conversion, Plasma medium.

A general discussion is given on magnetohydrodynamic generators as obtained from the columns of a newspaper.

AD-611 136 Div. 7, 26
CFSTI Prices: HC$2.00 MF$0.50

Times Wire and Cable Co., Inc., Wallingford, Conn.
DESIGN AND DEVELOPMENT OF WATERTIGHT RG 264B/U TYPE COAXIAL CABLE.
Interim development rept. for 13 Jul-13 Sep 64,
by David E. Karrmann. 13 Sep 64, 30p
Engineering rept. no. ER-281A
Contract NObsv91188, Proj. SF0060306, Task 2266
Unclassified report

Descriptors: (*Coaxial cables, Manufacturing methods), Watertight fittings, Electromagnetic shielding, Electrical properties, Test methods, Test equipment, Performance (Engineering), Graphics.

The purpose of the contract is to design, develop, and manufacture a watertight cable similar to RG 264B/U, with as high an effective crosstalk shielding and electromagnetic shielding as possible. The test techniques and equipment required to perform the test as outlined by the contract were evaluated and procedures established. These tests were performed on the existing construction of RG-264A/U to form a basis for comparison for the test results of new constructions. Various new constructions were designed and the manufacture of these constructions begun.

AD-611 208 Div. 7, 30
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Research Labs., Pittsburgh, Pa.
A HIGH REGULATION ION GAUGE POWER SUPPLY,
by J. S. Knoll. 25 May 60, 8p
Research rept. no. RR-403FD428-R4
Contract AF49 638 591
AFOSR TN-60-573 Unclassified report

Descriptors: (*Ionization gages, Power supplies), (*Power supplies, Ionization gages), Circuits, Direct current, Filaments, Voltage regulators, Ionic current, Galvanometers, Operation.

A dc filament emission regulator for the Bayard-Alpert ion gage is described. The regulator regulates the electron emission current against system pressure changes and powers the filament with highly regulated and filtered dc in order not to induce spurious ac signals at the ion collector which would mask the small ion current changes. The circuit diagram is given.

AD-611 269 Div. 7, 8
CFSTI Prices: HC$2.00 MF$0.50

Honeywell, Inc., Hopkins, Minn.
LOW INPUT VOLTAGE CONVERSION.
Quarterly progress rept. no. 2, 1 Jun-31 Aug 64,
by John T. Lingle and Kenneth J. Jenson.
31 Aug 64, 45p
Contract DA28 043AMC00030E, Proj. 1C6 22001A053
Unclassified report

See also AD-602 635.

Descriptors: (*Voltage regulators, Design), Energy conversion, Thermoelectricity, Generators, Thermionic converters, Batteries and components, Power supplies, Fuel cells, Transistors, Circuits, Switching circuits, Oscillators, Feedback, Inverters, Magnetic properties, Electrical properties.

Effort was directed towards circuit design to improve the switching characteristics of the current feedback oscillator so that efficient operation can be achieved at higher frequencies. A low input voltage converter-regulator model was fabricated by using new bias circuitry. This model was specifically designed for operation from a source consisting of two series connected fuel cells. Arrangements were made to test this converter from a two cell fuel cell. A converter-regulator model was designed for operation from a single thermionic diode with a terminal voltage in the 0.4 volt to 0.8 volt range. This model will be designed to accommodate a 150 ampere input current and will have a regulated 28 volt output. This model will be packaged in a cylindrical shape and the outer surfact will form the negative bus bar. Piece part drawings were completed and fabrication of this unit will commence shortly. Tentative arrangements were made to test this converter with a single thermionic diode.

AD-611 397 Div. 7, 19, 31
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Electric Corp., Lima, Ohio. Aerospace Electrical Div.
100 WATT THERMOELECTRIC POWER SYSTEM FOR BUOY APPLICATIONS.
Monthly progress rept. no. 8, 11 Jan-11 Feb 65,
by Dale A. Naumer. 11 Feb 65, 16p
Contract N600 61533 61992
Unclassified report

Descriptors: (*Thermoelectricity, Buoys), (*Buoy, Power supplies), Electric power production, Generators, Marker lights, Temperature control, Control systems, Programming (Computers), Combustion, Heat transfer, Performance (Engineering), Circuits, Heat exchangers, Thermal insulation.

Details are given concerning (1) computer calculation of the thermopile, including heat balance between hot and cold generators and (2) instructions for mounting the control unit.

AD-611 398 Div. 7
CFSTI Prices: HC$1.00 MF$0.50

Minnesota Mining and Mfg. Co., St. Paul.
300 WATT PORTABLE THERMOELECTRIC GENERATOR.
Monthly progress rept. no. 4 for period ending 31 Jan 65,
by R. D. Carlton. 31 Jan 65, 6p
Contract N600 61533 62758 Unclassified report

Descriptors: (*Thermoelectricity, Power supplies), (*Generators, Thermoelectricity), (*Electric power production, Thermoelectricity), Portable, Thermocouples, Cooling, Combustion chambers, Voltage regulators, Avalanche diodes, Heat transfer, Heat exchangers.

Two mock-up combustion chambers with different-length heat collector fins were fabricated and tested.

These tests were conducted to determine heat flux and burner efficiency. A heat flux of approximately 40 watts per sq in at 1100F was achieved with a corresponding burner efficiency of 62.5%. A fuel vaporizer was fabricated and tested with the present design burner head.

Thermoelectric couples were fabricated and tested. These couples are of the same composition as will be used in the generator but have a slightly larger L/A ratio. The second model fin array was fabricated and tested. This fin array consists of 45 fin strips of 0.005-in.-thick aluminum soldered onto a 0.015-in.-thick stainless steel cylinder. A prototype voltage regulator was constructed and electrical tests were conducted.

8. Electronics and Electronic Equipment

AD-610 837 Div. 8, 26
CFSTI Prices: HC$1.00 MF$0.50

Harry Diamond Labs., Washington, D. C.
SOLDER-GLASS SEALING OF MICROWAVE ANTENNA WINDOWS,
by T. V. Blomquist. 13 Nov 64, 15p TM-64-28
Projs. DA 1P523801A300, 96300

Unclassified report

Descriptors: (*Waveguide windows, Glass seals), (*Glass seals, Waveguide windows), (*Metal seals, Waveguide windows), Stainless steel, Vacuum seals, Thermal expansion, Mica.

Simple solder-glass techniques are described for vacuum-tight sealing of mica and glass microwave windows in a metal frame having a compatible coefficient of thermal expansion. The seal is made by applying 0.020 in. diameter threads of Corning No. 7570 solder glass to heated frame and window. A hand torch and quartz boat proved satisfactory for heating with mica of thicknesses of 0.003 in. or greater. A simple cone resistance heater with variac and a metal table provided more precise heating for sealing thinner windows. The materials are inexpensive; the procedure and equipment are simple. (Author)

AD-610 838 Div. 8, 5, 12
CFSTI Prices: HC$2.00 MF$0.50

Hughes Aircraft Co., Culver City, Calif.
PROPAGATION OF ELECTROMAGNETIC WAVES THROUGH INHOMOGENEOUS SLABS.
Scientific rept. no. 8,
by A. T. Villeneuve. Oct 64, 47p P64-116
Contract AF19 604 8386, Proj. 4600, Task 460001
AFCRL 65 1618

Unclassified report

Descriptors: (*Electromagnetic waves, Propagation), (*Radio transmission, Reentry vehicles), Electromagnetic wave reflections, Plasma sheath, Numerical analysis, Mapping (Transformations).

An approximation technique is considered for computing transmission and reflection coefficients for plane waves propagating through stratified slabs. The approximation uses a mapping of the given problem onto a similar, but exactly solvable problem. The approximate solution is then expressed in terms of the solution of the exactly solvable problem. As an illustration of the technique, the reflection and transmission coefficients of a transition layer are computed. Agreement between the exact and approximate values of the coefficients is good. (Author)

AD-610 839 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Hughes Aircraft Co., Culver City, Calif.
OPTIMIZATION TECHNIQUES FOR ANTENNA DESIGN.
Final rept. for 1 Mar 62-31 Dec 64,
by A. Ksienski and G. O. Young. 31 Dec 64, 16p
P64-128
Contract AF19 628 333, Proj. 4600, Task 460006
AFCRL 65 18

Unclassified report

See also AD-298 301, AD-600 365, AD-600 480.

Descriptors: (*Antennas, Design), (*Antenna configurations, Optimization), (*Optimization, Antenna configurations), Communication theory, Antenna radiation patterns, Theory, Linear systems, Nonlinear systems.

This program of research aimed at the evaluation of antennas as information-gathering devices and entailed the development of techniques that would permit the comparative evaluation of linear, nonlinear, and nonreciprocal antenna systems. These objectives were achieved and the results reported in several scientific reports. Summaries of those reports are included in thi final report. Their titles are: SR-1, Spatial Frequency Characteristics of Finite Aperture Antennas; SR-2, Information Theoretic Evaluation and Optimization of Antenna Systems; SR-3, Generalized Coherence Theory; and SR-4, Information Theoretic Evaluation of Nonlinear Antenna Systems. (Author)

AD-610 840 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Rome Air Development Center, Griffiss AFB, N. Y.
FIELD TEST AND EVALUATION OF A HELIX OPEN PERIODIC FILTER.
Summary rept.,
by John J. McCabe. Jan 65, 24p
Technical report no. RADC TR-64-559
Proj. 4540, Task 454003

Unclassified report

See also AD-608 661.

Descriptors: (*Filters (Electromagnetic wave), Feasibility studies), (*Microwave equipment, Filters (Electromagnetic wave), Band-pass filters, Microwave frequency.

The test results and evaluation of a feasibility model of a helix open periodic filter are presented. Analysis of the data indicates an infinitely wide stop band with a minimum attenuation of 50 db and observed rejections as high as 70 db. Pass band data indicates a loss of less than 0.4 db and a VSWR of less than 1.6:1 across most of the pass band. The filter was capable of accommodating the full output power (minimum of 2 MW) of the AN/FPS-65 at all frequencies. The filter tested demonstrated the feasibility of using open periodic structures for high power microwave filtering and their advantages over currently used techniques. (Author)

AD-610 848 Div. 8
CFSTI Prices: HC$2.00 MF$0.50

Edgerton, Germeshausen and Grier, Inc., Boston, Mass.
DEVELOPMENT OF A SUPER POWER DEUTERIUM THYRATRON.
Final rept.,
by Nicholas Reinhardt. 15 Feb 65, 44p Rept. no. B-2969
Contract NObsr89405, Proj. SR0080301, Task 9434

Unclassified report

Descriptors: (*Thyratrons, Design), (*Deuterium, Thyratrons), Electronic switches, Modulators, Construction, Effectiveness, Oxide cathodes, Electron tube parts, Tests.

The design, development, fabrication and evaluation of six super-power deuterium thyratrons is described in detail.

AD-610 851 Div. 8
CFSTI Prices: HC$7.00 MF$2.00

RCA Defense Electronic Products, Camden, N. J.
PRODUCTION ENGINEERING MEASURE.
MICROELEMENT CAPACITORS.
Formal engineering rept.
Jan 65, 370p
Contract DA36 039SC75968, Task 28

Unclassified report

Rept. on Micromodule Program Estension II.

Descriptors: (*Capacitors, Microminiaturization (Electronics)), (*Subminiature electronic equipment, Capacitors), (*Microminiaturization (Electronics), Modules (Electronic)), (*Modules (Electronic), Microminiaturization (Electronics)), Ceramic capacitors, Electrolytic capacitors, Tantalum capacitors, Manufacturing methods, Performance (Engineering), Machines, Metal coatings, Production, Disks.

This report describes a program to develop sources of microelement capacitors of various characteristics to support a micromodule requirement of 25,000 per month. The capacitors selected were single-layer and multilayer ceramic capacitors in both general purpose and precision types, tantalum electrolytic capacitors, and variable ceramic capacitors. As a result of the program, two suppliers of general purpose and precision ceramic microelement capacitors, two suppliers of tantalum capacitors, and one of variable ceramic capacitors were established. Production rates in excess of the contracted rates were demonstrated on equipment production orders during the pilot run. Two subtasks were included under the program, both concerned with the metallization of ceramic substrates. One subtask was the establishment of an automated production facility to produce metallized ceramic end wafers for module assembly and metallized ceramic substrates for use by microelement suppliers. The other metallization subtask consisted of the development of an automatic notch and land metallizing machine for ceramic wafers.

AD-610 866 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

New York Univ., N. Y.
AN INTRODUCTION TO ERROR CONTROL TECHNIQUES,
by Jack Keil Wolf. Jan 65, 18p
Contract AF30 602 3450, Proj. 4519, Task 451903
RADC TDR64 558

Unclassified report

Descriptors: (*Communication systems, Errors), (*Coding, Digital systems), Corrections, Communication theory, Control systems, Data transmission systems, Modulation, Feedback.

The objective of this report is to formulate a common structure in which may be imbedded various techniques for the control of errors in communication systems. The relationship between digital error-correction and error-detection coding techniques and modulation systems is examined. A brief exposition is presented on the more promising techniques which have been proposed for digital coding. The report concludes with recommendations for future investigations. (Author)

AD-610 871 Div. 8
CFSTI Prices: HC$2.00 MF$0.50

Texas Instruments, Inc., Dallas.
OPTOELECTRONIC FUNCTIONAL ELECTRONIC BLOCKS.
Interim engineering rept. no. 6, 1 Nov-31 Dec 64,
by J. R. Biard. 2 Feb 65, 50p Rept. no. TI-03-65-10
Contract AF33 657 11552

Unclassified report

See also AD-609 509.

Descriptors: (*Semiconductor devices, Integrated circuits), (*Integrated circuits, Semiconductor devices), (*Electron optics, Integrated circuits), Gallium alloys, Arsenic alloys, Diffusion, Crystal lattice defects, Coupling circuits, Demodulators, Silicon, Light, Photoelectric cells (Semiconductor), Glass, Coatings, Phosphorus alloys, Luminescence, Oxides, Life expectancy, Degradation, Bonding.

This program has been concerned with the application of optoelectronics to broaden the applicability of silicon integrated circuits. Combination of the isolation feature of optical coupling with existing silicon integrated circuit technology has resulted in a new series of Functional Electronic Blocks (FEB's) which provide functions previously impossible or extremely difficult to attain in solid-state form. Thermal cycling tests on additional epoxy-covered glass-bonded photo-pairs indicate that a reasonable yield of stable pairs with good coupling can be obtained with this approach. Shaped flat sources exhibit better coupling, but the improvement is not as great as expected. Some of the characteristics of oxide-isolated silicon detectors are presented. The characteristics of the first group of FEB-compatible guard-ring light sources are described. Additional correlation has been found between quantum efficiency and the dislocation density in the starting material. Diffusion experiments with gallium arsenide have continued. Epitaxial GaAsP is found to have a high dislocation density. Detailed examination of a high efficiency gallium arsenide light source, coupled with additional experimentation, has led to the conclusion that the internal radiative recombination efficiency approaches 100% over the temperature range studied. A summary of life-test experiments with gallium arsenide light sources is presented.

AD-610 899 Div. 8, 20
CFSTI Prices: HC$2.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
USE OF CHERENKOV EFFECT TO GENERATE HIGH RADIO FREQUENCIES,
by V. L. Ginzburg and I. M. Frank. Feb 54, 26p
T-103-R
TT 65 61627

Unclassified report

Ob Ispol'zovanii Effekta Cherenkova dlya Izlucheniya Radiovoln, trans. Akademiya Nauk SSSR. Doklady, 1947, v. 56, no. 2, p. 145-148; no. 3, p. 253-254; no. 6, p. 583-586; no. 7, p. 699-702.

Descriptors: (*Cerenkov radiation, Microwave frequency), (*Electrons, Cerenkov radiation), (*Microwave frequency, Cerenkov radiation), Dielectrics, Doppler effect, Radio waves, Relativity theory, USSR, Radiofrequency.

In this paper the possibility is examined of utilizing the Cerenkov effect to produce an intense emission of radio waves and, in particular, waves of less than one centimeter in length. The emission of microwaves by a relativistic electron is discussed for the case of electrons moving in proximity to a dielectric. The complex Doppler effect occurring at velocities greater than the phase-velocity of light in a medium is examined. Also considered is the question of the emission from an electron and

from an atom moving along the axis of a channel in a dense medium.

AD-610 943 Div. 8
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., King of Prussia, Pa. Spacecraft Dept.
ACCELERATED TESTING OF HIGH RELIABILITY PARTS,
Interim technical rept. no. 1, 10 Jun-10 Oct 64,
by T. M. Walsh, H. S. Endicott, G. Best, G. Bretts, and H. Lampert. Jan 65, 95p
Contract AF30 602 3415, Proj. 5519, Task 551902
RADC TDR-64-481
Unclassified report

Descriptors: (*Semiconductor devices, Model tests), (*Resistors, Test methods), (*Capacitors, Test methods), Degradation, Stresses, Metal films, Reliability (Electronics), Failure (Mechanics), Phosphorus compounds, Aging (Materials), Films, Oxides, Diodes, Glass.

A review of data and information gathered during previously conducted accelerated test programs has led to the formulation of degradation models for the parts under study. Long term constant stress tests, which were inactive for a 9-month period after accumulating 5000 to 9000 hours of test time at various stress conditions, were restarted. The effect of the passive period on the long-term part parameter trends is discussed. Accelerated step stress test designs and analysis plans were formulated for metal film resistors and semiconductors and step-stress tests were initiated. Failure Mechanism Studies led to the formulation of a current conduction model for glass dielectric capacitors; the detection, possible source and estimated effects of phosphorus compounds on surface leakage of transistors; and low temperature characterization of diode surface leakage currents. (Author)

AD-610 952 Div. 8, 5, 15
CFSTI Prices: HC$1.00 MF$0.50

Operations Research Center, Univ. of Calif., Berkeley.
SOME INEQUALITIES GOVERNING OPTIMUM CODE,
by T. C. Hu. 23 Oct 64, 16p ORC-64-27
Contract Nonr22283; Grant NSF GP2633
Unclassified report

Descriptors: (*Coding, Optimization), (*Inequalities, Coding), (*Combinatorial analysis, Coding), Operations research, Communication theory, Probability, Topology, Economics.

AD-610 956 Div. 8, 26
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
U. S. ARMY ADVANCEMENT IN TRANSISTOR RELIABILITY THROUGH MANUFACTURING PROCESS IMPROVEMENTS,
by Edward B. Hakim and Bernard Reich. Nov 64,
18p Technical rept. ECOM-2472
Proj. 1P6 22001 A056, Task 1P6 22001 A056 02
Unclassified report

Descriptors: (*Transistors, Manufacturing methods), (*Reliability (Electronics), Transistors), Processing, Diffusion, Metalation, Electric wire, Bonding, Gold, Aluminum, Packing, Design, Silicon alloys, Germanium alloys, Tests, Semiconductors.

The report outlines transistor reliability improvements achieved by semiconductor manufacturers who incorporated improving processing techniques into their lines. These advancements were achieved under the project known as the Production Engineering Measures program for transistor reliability improvement. The procedures reported upon include the status of reliability of the particular devices used in the program (in most cases the entire family of devices); the methods of monitoring relative improvements; and advanced techniques of specific processes such as diffusion, metalization, lead bonding, packaging, and photoresist. (Author)

AD-610 969 Div. 8, 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
INTERRELATIONS OF AURORA, RADIOWAVE PROPAGATION, MAGNETIC AND IONOSPHERIC DISTURBANCE,
by F. Ya. Zaborshchikov and N. I. Fedyakina.
May 58, 16p T-288-R
TT 65 61648
Unclassified report

Trans. of Problemy Arktiki (USSR) 1957, no. 2, p. 149-159. Also available from HRC as C-2732, 14p.

Descriptors: (*Radio waves, Propagation), (*Atmospherics, Radiofrequency interference), Aurorae, Magnetic storms, Ionospheric disturbances, Terrestrial magnetism, High frequency, Very high frequency, Radio transmission, Attenuation, Monitors, USSR.

At the Tiksi Bay Arctic Station in November, December and January of 1955/56, the Arctic Institute conducted auroral observations and monitoring of radio signals in the 24-69 mc frequency band. The data from these observations were compared with the records of the H-component of the geomagnetic field, and with ionospheric records. The results of this work are presented in the present paper. (Author)

AD-610 974 Div. 8, 2
CFSTI Prices: HC$3.00 MF$0.75

Directorate of Scientific Information Services, Ottawa (Ontario).
RESULTS OF RESEARCH ON THE OUTER REGION OF THE IONOSPHERE, FROM OBSERVATIONS OF THE RADIO SIGNALS OF SPUTNIK 1. CALCULATION OF MAXIMUM DISTANCE OF RADIOWAVE PROPAGATION IN THE OPTICAL GEOMETRIC APPROXIMATION, FOR A SPHERICAL EARTH,
by Ya. L. Al'pert, E. F. Chudesenko, B. S. Shapiro, F. F. Dobryakova, and Z. A. Malina. Oct 58, 53p
T-306-R
TT 65 61651
Unclassified report

Trans. of Uspekhi Fizicheskikh Nauk (USSR) 1958, v. 65, no. 2, p. 161-174; Predvaritel'nye Itogi Nauchnykh Issledovanii s Pomoshch'yu Pervykh Sovetskikh Iskusstvennykh Sputnikov Zemli i Raket, Sbornik Statei (USSR) 1958, no. 1, sect. 2, p. 40-108.

Descriptors: (*Satellites (Artificial), Atmospheric sounding), (*Atmospheric sounding, Radio transmission), (*Radio transmission, Atmospheric sounding), Radio waves, Propagation, Ranges (Distance), Graphics, Tables, USSR.

A possible method is examined for conducting satellite radio observations. The method is based on determining the moments of 'radio rising' and 'radio setting', from

which the electron concentration N(z) of the ionosphere above the maximum level may be derived. Preliminary results from the analysis of the experimental data are set forth. The analysis of the results leads to certain important and interesting concepts concerning the outer ionosphere. Quantitative characteristics were derived for the decrease of the electron concentration and neutral particle density in this region; also certain notions of the 'boundary' where the atmosphere makes contact with the interplanetary gas.

AD-610 982 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
COMPUTATION OF THE FIELD OF LF AND VLF RADIOWAVES OVER THE EARTH'S SURFACE UNDER NATURAL CONDITIONS,
by Ya. L. Al'pert. Nov 59, 18p T-320-R
TT 60-14028

Unclassified report

Trans. of Radiotekhnika i Elektronika (USSR) 1956, v. 1, no. 3, p. 281-292.

Descriptors: (*Radio fields, Radio waves), (*Radio waves, Propagation), Low frequency, Very low frequency, Ionospheric propagation, Electromagnetic waves, Mathematical analysis, Graphics, USSR.

Results are presented of theoretical calculations of the propagation, over the earth's surface, of electromagnetic waves in the 500- to 30,000-cycle range, with allowance for the stratiform inhomogeneity of the ionosphere and for the dependence of ionospheric conductivity on frequency. The pole equation is solved for the selected model of the ionosphere, and thus the wave-numbers of the discrete spectrum of waves forming the field at the point of observation are calculated. Analysis of the 'interference coefficient' has shown that the phase and amplitude of the field vary in a complicated irregular fashion in relation to distance and frequency. Graphs were constructed for the relationship between field intensity and frequency for various distances in the 500- to 10,000-km range. Field intensity measurements known from the literature and also results from other experiments are compared with the theoretical computations. A good agreement is found, even to a number of details.

AD-611 000 Div. 8, 25
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Corp., Los Angeles, Calif.
ELECTRONICS RESEARCH PROGRAM. INFRARED AND ULTRAVIOLET DEVICE RESEARCH.
Semiannual technical note for 1 Jul-31 Dec 62,
by J. Munushian. 20 May 63, 12p
Rept. no. TDR-169(3250-11)TN-1
Contract AF04 695 169
SSD TDR-63-116

Unclassified report

Descriptors: (*Lasers, Diodes (Semiconductor)), (*Camera tubes, Infrared image tubes), Gallium alloys, Arsenic alloys, Cavity resonators, Ultraviolet equipment, Infrared equipment, Performance (Engineering), Energy conversion.

Work has been done on a study of recombination radiation in gallium arsenide and other intermetallic compounds. Techniques for the fabrication of gallium arsenide injection diodes, including the cleaving method for shaping the resonant cavity, have been developed. Several hundred diodes have been made and tested for both coherent and incoherent operation. Results for the coherent diodes are comparable to those obtained by other investigators. Firm evidence for coherent operation has not been obtained. Work has also been done on experimental study of the performance capability of infrared camera tubes in accordance with new standards being developed by the IRIS Specialty Group on Image Sensing Devices. (Author)

AD-611 008 Div. 8
CFSTI Prices: HC$3.00 MF$0.75

Coordinated Science Lab., Univ. of Illinois, Urbana.
DISTRIBUTED RC NETWORKS WITH RATIONAL TRANSFER FUNCTIONS,
by Kenneth W. Heizer. Sep 62, 90p
Rept. no. R-153
Contract DA36 039SC85122, Task 3 99 01 002

Unclassified report

Descriptors: (*Electrical networks, Mathematical analysis), Functions, Admittance, Electrical impedance, Synthesis, Transmission lines, Transformations (Mathematics).

A distributed RC circuit analogous to a continuously tapped transmission line can be made to have a rational short-circuit transfer admittance and one rational short-circuit driving-point admittance. A subcircuit of the same structure has a rational open circuit transfer impedance and one rational open circuit driving-point impedance. Hence, rational transfer functions may be obtained while considering either generator impedance or load impedance. The functions have poles only along the negative real axis. Although the number of poles is arbitrary, only two may be chosen with complete freedom in a single unit. The residue of a pole in the short-circuit transfer admittance is related to the corresponding residue of the rational driving-point short-circuit admittance. A wide class of transfer functions may be realized by placing one distributed circuit in parallel with the output of another distributed circuit. The loss and total capacity required are often the same order of magnitude as those for lumped circuits. Complex zeroes may readily be obtained with these circuits. In many cases active elements may be used to an advantage in the same manner as with lumped RC networks. (Author)

AD-611 009 Div. 8, 15
CFSTI Prices: HC$3.00 MF$0.75

Coordinated Science Lab., Univ. of Illinois, Urbana.
A NUMERICAL APPROXIMATION TECHNIQUE FOR FILTER FUNCTIONS.
by William Frederick McGee. Aug 62, 67p
Rept. no. R-151
Contract DA36 039SC85122, Task 3 99 01 002

Unclassified report

Descriptors: (*Filters (Electromagnetic wave), Functions), (*Numerical methods and procedures, Functions), (*Functions, Filters (Electromagnetic wave)), Polynomials, Iterative methods, Electric filters, Band-pass filters, Attenuation.

A new method is proposed for generating amplitude-frequency filter transfer functions of the usual type. The method consists of two algorithms based on modifications of the second method of Remez. Using this method it is shown how to generate the following types of filter functions: the low-pass equi-ripple polynomial filter function with zeros at the origin; the low pass equi-ripple filter function with a variable number of zeros in the pass-band and a variable number of poles in the stop-band; the asymmetrical equi-ripple band-pass filter function; and

the double band-pass equi-ripple filter function. The parameters that must be specified are discussed. Modifications to the basic methods that make them more useful to the filter designer are also presented. A discussion is given of the convergence of the proposed algorithms. Examples are given. It is expected that these methods will be useful in filter design.

AD-611 034 Div. 8, 30

Emmanuel Coll., Boston, Mass. Research Language Center.
POLARIMETER: A STUDY OF THE POLARIZATION OF RADIO WAVE REFLECTION IN THE IONOSPHERE, I,
by Chung-t'i Pao. May 64, 27p E-T-Ch-64-14
Contract AF19 628 3869
TT 65-61703

Unclassified report

Trans. of Wu Han Ta Hsueh: Tzu Jan K'o Hsueh Hsueh Pao (Chinese People's Republic) 1957, no. 2, p. 103-118. Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Radio waves, Polarization), (*Ionospheric propagation, Radio waves), (*Measuring devices (Electrical and Electronic)), (*Polarization, Measuring devices (Electrical and Electronic)), Electromagnetic wave reflections, Ionosphere, Polariscopes, Antennas, Antenna feeds, Electromagnetic shielding, Oscilloscopes, Errors, Measurement.

This paper outlines the fundamental theory of design and the principal circuits of the instrument, and discusses in detail such complicated problems as the shielding of the antenna and feeder, the various requirements for the twin-channel pulse receiver and the special circuits of the indicator. It also discusses the range of measuring errors. (Author)

AD-611 047 Div. 8,2,25
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
A DIRECT CURRENT AMPLIFIER FOR PHOTOELECTRIC PHOTOMETRY,
by Ch'uan-chin Wang. 2 Feb 65, 11p FTD-TT-64-828
TT 65-61694

Unclassified report

Edited trans. of T'ien Wen Hsueh Pao (Chinese People's Republic) 1963, v. 11, no. 1, p. 74-78.

Descriptors: (*Photometers, Current amplifiers), (*Current amplifiers, Photometers), Direct current, Astronomy, Optical instruments, China.

AD-611 068 Div. 8, 25
CFSTI Prices: HC$3.00 MF$0.75

Martin Marietta Corp., Orlando, Fla.
LOW NOISE MILLIMETER DETECTOR.
Final rept. for Jul 63-Aug 64,
by E. Valkenburg. Jan 65, 72p OR-6228
Contract AF30 602 3183, Proj. 5573, Task 557304
RADC TDR-64-504

Unclassified report

Descriptors: (*Crystal detectors, Millimeter waves), Noise (Radio), Extremely high frequency, Video signals, Semiconductors, Crystals, Photoelectric cells (Semiconductor), Sensitivity, Signal-to-noise ratio, Crystal holders, Silicon, Lead alloys, Selenium alloys, Bismuth alloys, Tellurium alloys.

This report describes a program of study and investigation which was carried out to determine the optimum crystal materials and detector mount configuration for a low noise millimeter detector in the frequency range of 280 plus or minus 20 gc. Fifteen semiconductor crystal materials were evaluated for tangential sensitivity and video resistance. Of these materials, silicon, lead selenide and bismuth telluride exceeded the sensitivity goal of 10 to the minus 10th power watts for a band-width of one cps and unity signal-to-noise ratio. Material samples and detector mounts were provided as deliverable items to the contracting officer. Sufficient data were obtained for each crystal material to provide a good statistical representation of performance. In addition, the following tasks are reported on: Measurement of the performance of a Raytheon Photoelectric Millimeter Wave Detector at 290 gc. Evaluation of bi-metallic contact performance using pointed whiskers on clean metal posts. (Author)

AD-611 083 Div. 8, 15, 30
CFSTI Prices: HC$4.00 MF$1.00

Electronics Research Lab., Univ. of California, Berkeley.
NOTES ON SYSTEM THEORY. VOLUME VI.
Aug 64, 125p Rept. no. 64-8
Grants AF AFOSR292 64, AF AFOSR230 64

Unclassified report

See also AD-601 993.

Descriptors: (*Electrical networks, Mathematical analysis), (*Electronics, Scientific research), (*Mathematical programming, Electrical networks), Nonlinear systems, Combinatorial analysis, Linear programming, Networks, Iterative methods, Nonlinear differential equations, Matrix algebra, Sequential analysis, Operators (Mathematics), Automata, Capacitance, Resistance (Electrical), Coding, Algebraic topology.

Contents: On decomposition techniques applied to the solution of linear programming problems; On a theorem for nonlinear networks; A note on the identification of a class of nonlinear time-invariant systems; A stability criterion obtained by comparison; Relational equivalence of sequential machines; The conversational method of synthesis for finite automata; A galois field multiplier; On the inverse of the Lyapunov operator; A real frequency stability criterion containing periodically time-varying capacitances and resistances; A note on polar decomposition and the generalized inverse of an arbitrary matrix; Reduction of a linearly separable pattern set to a minimum distance problem; On a combinatorial theorem and applications; On nonlinear differential equations with delta functions driving forces; A new proof of the Wang algebra for networks.

AD-611 098 Div. 8, 15
CFSTI Prices: HC$3.00 MF$0.75

Coordinated Science Lab., Univ. of Illinois, Urbana.
ON PHYSICAL REALIZABILITY OF SIGNAL FLOW GRAPHS AND REALIZATION TECHNIQUES,
by Manohar Lal. Dec 62, 55p R-157
Contract DA36 039SC85122, Task 3 99 01 002

Unclassified report

Descriptors: (*Electrical networks, Mathematical models), (*Mathematical models, Electrical networks),

Matrix algebra, Topology, Networks, Linear systems, Feedback, Statistical analysis, Graphics.

The problem of physical realizability of the signal flow graphs is taken up in this thesis and two classes of signal flow graphs are defined. It is shown that the class A encompasses all networks with independent sources, excluding mutual inductances. The realizability condition for this class is given and a realization technique established. The second class, that is class B is shown to cover a very large class of active networks. The realizability condition and a realization technique for this class are also given. The importance of these results for the network analysis and synthesis is discussed. Some aspects of the network synthesis problem are also discussed and certain advantages of the synthesis through signal flow graph are pointed out. An attempt is made to establish an algorithm for deriving a member of class A or class B of signal flow graphs from the specified network function. Some difficulties in the way of achieving this are brought out.

AD-611 099 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Weston Instruments, Inc., Newark, N. J.
A POROUS SUBSTRATE RESISTOR AIMED AT MINIATURIZATION OF METAL-FILM RESISTORS.
Interim development rept. no. 9, phase 2,
1 Sep-30 Nov 64,
by T. Matley and R. E. Busch. 30 Nov 64, 21p
Contract NObsr87542, Proj. SR0080303, Task 9636
Unclassified report

See also AD-607 989.

Descriptors: (*Miniature electronic equipment, Resistors), (*Resistors, Miniature electronic equipment), (*Metal films, Resistors), (*Hysteresis, Resistors), Porous materials, Quartz, Aluminum compounds, Oxides, Electric terminals, Resistance (Electrical), Thermal conductivity, Metal coatings, Temperature.

Temperature gradients resulting from electrical loading were found not to be the fundamental cause of resistance shift or hysteresis. One likely source of contamination namely, wax from the slicing and dicing operation to produce substrates was similarly found not to be a cause of resistance shift. A better reflux cleaning cycle, however, evolved which allows better quality metallizing as determined visually. The actual cause of resistance shift could not be determined. Porous substrates exhibiting the most uniform structure produce resistors with the smallest % deviation in resistance. An initial investigation of solid impregnants indicates that a broad range of stiffness (modulus of elasticity) of the impregnant material can be successfully employed. (Author)

AD-611 124 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Naval Postgraduate School, Monterey, Calif.
BAND WIDTH OF A KNIFE-EDGD SCATTER CIRCUIT.
Research rept.,
by David B. Hoisington. Jan 65, 14p RP-50
Unclassified report

Descriptors: (*Microwave communication systems, Multipath transmission), (*Radio waves, Diffraction), (*Electromagnetic wave reflections, Microwave communication systems), Microwave networks, Antenna radiation patterns, Bandwidth, Radio transmission, Attenuation, Propagation, Data transmission systems, High frequency.

The bandwidth of a knife-edge scatter circuit is estimated as a function of the antenna beam width. The knife edge is assumed to be located off to one side of a line between the transmitter and receiver as in the Monterey-San Jose circuit, but is assumed to be in a plane with this line. It is shown that where the effective knife edge is small compared to the beam width, the signal may be completely cancelled at the receiver. This cancellation can best be avoided by moving one antenna a lateral distance that is calculated. On the basis of the equations developed in this report, the bandwidth between nulls of the Monterey-San Jose microwave circuit was calculated to be 2.6 Mc. The measured bandwidth was 3.4 Mc. (Author)

AD-611 131 Div. 8, 25, 26
CFSTI Prices: HC$2.00 MF$0.50

Bulova Watch Co., Woodside, N. Y. Electronics Div.
PRODUCTION ENGINEERING MEASURE FOR TYPE CR-(XM-60)/U CRYSTAL UNITS.
Quarterly rept. no. 1, Jul-Sep 64,
by C. C. Spreckels. Sep 64, 28p
Contract DA36 039AMC03633E
Unclassified report

Descriptors: (*Crystals, Semiconductor devices), (*Crystal holders, Manufacturing methods), Quartz, Specifications, Design, Quality control, Etched crystals, Welding, Lead, Aging (Materials), Low frequency.

Bulova is manufacturing the CR-47A/U crystal units at 200,000 KC, 350,000 KC, and 500,000 KC. With respect to the CR-(XM-60)/U crystal units, Bulova has received Kold Weld Sealing equipment and is actively engaged in the procurement of Kold Weld bases and cans. Lead attachments by Ultrasonic Weld method rather than Thermo Compression Method will be pursued because of its adaptability to mass production. The above two study phases are considered the most important phases to increase the reliability of the CR-47A/U crystal units. Partial results have been determined in the lapping of crystal loaves. (Author)

AD-611 141 Div. 8, 26
CFSTI Prices: HC$5.00 MF$1.00

Hamilton Standard Div., United Aircraft Corp., Windsor Locks, Conn.
ELECTRON BEAM TECHNIQUES FOR FABRICATION AND ASSEMBLY OF PARTS FOR ELECTRON TUBES.
Phase 2, rept. for 1 Jul 63-31 Aug 64,
by John F. Dudenhoefer. 31 Aug 64, 173p
Rept. no. EBR-147
Contract DA36 039AMC03625E
Unclassified report

Descriptors: (*Electron tubes, Manufacturing methods), (*Welding, Electron beams), Machines, Welds, Electron tube parts, Performance (Engineering), Seals (Stoppers), Metal joints.

This report documents the results of Phase II of this three-phase Production Engineering Measure. The objectives of this phase are outlined. Selection and modification of joints to be welded are discussed. Definition of the welding facility is presented. Fabrication and performance testing of engineering sample tubes is reported. (Author)

AD-611 161 Div. 8, 5
CFSTI Prices: HC$4.00 MF$1.00

Clarkson Coll. of Tech., Potsdam, N. Y.
DIRECT MICROWAVE RADIATION FROM 100 KEV ELECTRON BUNCHES IN A CIRCULAR ORBIT.
Final rept. for Apr 63-Sep 64,

by R. W. Redlich, J. F. Adams, L. G. Space, and W. Menges. Jan 65, 132p
Contract AF30 602 3049, Proj. 5573, Task 557303
RADC TDR-64-458
Unclassified report

Descriptors: (*Electron beams, Electromagnetic waves), (*Electromagnetic waves, Electron beams), Microwaves, Energy, Magnetic fields, Production, Harmonic analysis, Fourier analysis, Atomic orbitals.

This task called for a study and investigation of the generation of microwave energy by direct radiation from electron bunches orbiting in a strong magnetic field. Electrons were injected into a magnetic field whose strength was 2000 gauss. Microwave energy was detected at the fundamental bunching frequency of 4000 MC/S. This energy was measured to be .2 microwatts. There was no detectable harmonic microwave energy. Experimental results were in general agreement with the theory, except that the radiation output was much lower than theoretical predictions. This was thought to be due to inadequate bunching. This program has demonstrated that it is feasible to obtain direct microwave radiation by this method. (Author) As appendixes there are included theses (1) by Lawrence G. Space with the same title as this final report and (2) by William R. Menges, 'A study of nearly circular trajectories in a static magnetic field.'

AD-611 169 Div. 8, 22, 25, 30
CFSTI Prices: HC$6.00 MF$1.50

Institute for Cooperative Research, Univ. of Pennsylvania, Philadelphia.
THE DEVELOPMENT OF MEASURING SYSTEMS FOR PRIMARY CALIBRATION OF ORDNANCE CORPS TEST EQUIPMENT.
Final rept. for 1 Nov 63-31 Dec 64,
by G. A. Rechnitz, V. K. Schultz, R. M. Showers, Jurij Maczuk, and Richard F. Schwartz. 31 Dec 64, 257p
Contract DA36 034ORD3693RD, Tasks A, B
Unclassified report

See also AD-429 285.

Descriptors: (*Measuring devices (Electrical and Electronic), Ordnance laboratories), (*Test equipment (Electronics), Calibration), (*Ordnance laboratories, Test equipment (Electronics)), Measurement, Moisture, Electrolytic cells, Lasers, Infrared radiation, Photoconductivity, Semiconductors, Radiofrequency power, Microwave frequency, Bolometers, Calorimeters, Standards, Chromium, Determination.

Contents: Moisture content measuring techniques, including differential controlled-potential coulometry for the determination of chromium; Output energy measurements for infrared solid state lasers; microwave power measurement standards.

AD-611 178 Div. 8
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Auburn, N. Y. Semiconductor Products Dept.
RESEARCH AND DEVELOPMENT OF SILICON CONTROLLED RECTIFIERS FOR HIGH FREQUENCY AMPLIFIER APPLICATIONS.
Quarterly progress rept. no. 1, 16 Oct 64-16 Jan 65. 16 Jan 65, 44p
Contract NObsr91299, Proj. SR0080304, Task 9348
Unclassified report

Descriptors: (*Rectifiers, Silicon), (*Silicon, Rectifiers), Semiconductor devices, Amplifiers, High frequency, Solid state physics, Performance (Engineering), Electric currents, Electronic switches, Voltage, Transients.

The factors affecting the design and performance of high-power, high-frequency silicon controlled rectifiers are discussed in detail. The inter-related problems of di/dt, dv/dt, turn-off time, turn-on time, current rating, and voltage blocking capability are reviewed, and the technical approach to their balanced solution is outlined. (Author)

AD-611 200 Div. 8
CFSTI Prices: HC$3.00 MF$0.75

Army Electronics Command, Fort Monmouth, N. J.
ANALYSIS AND DESIGN OF CRYSTAL OSCILLATORS, PART I,
by Erich Hafner. May 64, 55p
Technical rept. no. ECOM-2474
Proj. 1P6 22001A058, Task 1P6 22001A058 01
Unclassified report

Descriptors: (*Crystal oscillators, Design), (*Graphics, Crystal oscillators), Stability, Electrical impedance, Feedback, Quartz, Oscillation, Power, Harmonic oscillators.

The approach developed in this report appears to satisfy all the major requirements that must be placed on a unifying technique for oscillator analysis and design. As demonstrated on specific examples, the conditions for oscillation in a generally valid form can be processed to determine (a) the amplitude of oscillation in relation to the characteristics of the active device, (b) the requirements on the feedback network to operate the crystal unit according to its specifications, (c) the changes in frequency of oscillation in response to variations in any one of the circuit components and hence the values required for these components to obtain maximum stability, and (d) the output power in proportion to the power dissipated in the crystal unit. The key to this approach lies in a graphical method for solution of the oscillator phase equation in the impedance plane. The impedance diagrams obtained thereby open the way to a thorough qualitative understanding of the cause-effect relationships in oscillator performance and provide the guidelines to bring the analytic expressions into a convenient form for quantitative work. Detailed discussions are carried out for the Pierce oscillator and the bridged-T oscillator to illustrate the practical application of the approach. (Author)

AD-611 202 Div. 8, 25
CFSTI Prices: HC$2.00 MF$0.50

Sylvania Electric Products, Inc., Waltham, Mass.
SELF AND MUTUAL ADMITTANCES OF WAVEGUIDES RADIATING INTO PLASMA LAYERS,
by J. Galejs. 1 Sep 64, 39p
Scientific rept. no. SR-5, Research rept. no. RR-416
Contract AF19 628 2410, Proj. 4642, Task 464202
AFCRL 64-1000
Unclassified report

See also AD-609 304.

Descriptors: (*Waveguide slots, Admittance), (*Admittance, Waveguide slots), (*Plasma medium, Waveguide slots), Slot antennas, Plasma sheath, Waveguides, Integrals, Electromagnetic fields, Atmosphere entry, Antenna radiation patterns, Dielectrics.

The self and mutual admittance of wave guide backed slots radiating into a plasma (or dielectric) layer has been formulated in a laterally unbounded geometry. The admittance expression involves integrals that may be approximated by summations for numerical calculations. For a constant mesh size approximation to the integrals the summations are the same as obtained in earlier work, where the plasma layers are considered to be within a wide wave guide. The accuracy of the solution is improved by decreasing the mesh size used for the numerical integration, which is equivalent to increasing the size of the large guide in the wave guide model. Mutual admittance calculations between two-parallel slots show that the presence of a plasma layer decreases the mutual admittance relative to its free space value. (Author)

AD-611 212 Div. 8, 14, 25
CFSTI Prices: HC$3.00 MF$0.75

Army Materials Research Agency, Watertown, Mass.
PROPERTIES OF PIEZOELECTRIC MATERIALS.
Monograph series,
by Bruce D. Wedlock. Jun 64, 80p AMRA MS-64-05
Unclassified report

Descriptors: (*Piezoelectric crystals, Physical properties), (*Tables, Piezoelectric crystals), Mechanical properties, Electrical properties, Dielectric properties.

The purpose of this monograph is to provide a source of data on a wide variety of piezoelectric materials which will be useful to those conducting research in this area as well as to the engineer designing ultrasonic transducers, filters, and other piezoelectric devices. The numerical data are given in the rationalized MKS system in accordance with the IRE Standards on Piezoelectricity, as are the symbols employed. Table I defines the symbols employed and gives their MKS unit. Since a large amount of literature still uses the CGS system, Table II presents the factors to convert CGS units to MKS units. On the data pages, the digits in the data columns are to be multiplied by the power of ten in the column immediately to the right of the symbol to obtain the value in the MKS system. The compounds are arranged alphabetically by chemical name. The pure compounds are followed by the binary alloys, followed by ternary compounds, etc. The multiple component compounds are arranged alphabetically by main constituent, secondary constituent, etc., and by decreasing amount of main constituent. (Author)

AD-611 213 Div. 8
CFSTI Prices: HC$2.00 MF$0.50

Microwave Electronics Corp., Palo Alto, Calif.
DEVELOPMENT OF TWO X-BAND VARIABLE GAIN TWTS (ONE LOW LEVEL AND ONE MEDIUM LEVEL).
Interim development rept. no. 2, 1 Oct-31 Dec 64,
by Norman Berger. Feb 65, 46p
Contract NObsr91341, Proj. SF0100201, Task 9294
Unclassified report

See also AD-608 656.

Descriptors: (*Traveling-wave tubes, X-band), Gain, Helixes, Voltage, Radiofrequency, Noise (Radio), Electron beams, Velocity, Performance (Engineering), Graphics.

Two tubes were tested to ascertain the best range of gamma a for variable gain operation. The lower gamma a tube provides the best gain control. Two three-helix, variable gain tubes were tested. The gain variation was greater than anticipated, and noise figure and saturated power output exceeded allowable limits. (Author)

AD-611 217 Div. 8, 26
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Electric Corp., Philadelphia, Pa.
PRODUCTION ENGINEERING MEASURE. TYPE 2N2762 SILICON ALLOY TRANSISTOR.
Quarterly progress rept. no. 6, 1 Oct-31 Dec 64,
by R. J. Pisarcik, J. Priest, and W. E. Shopsky.
31 Dec 64, 22p
Contract DA36 039AMC03617E
Unclassified report

During this rept. period the contract device has been changed from the Production Engineering Measure, Type 2N1814 Silicon Alloy Transistor.
See also AD-609 260.

Descriptors: (*Transistors, Manufacturing methods), Reliability (Electronics), Silicon alloys, Processing, Encapsulation, Soldering, Diffusion.

Two programs, reduction of thickness of collector alloy and improved collector preform annealing, have been substituted for the programs previously terminated. In addition, an improved method for base assembly storage and a reduction in the thickness of the molybdenum mounting disc have been added as process improvements. The contract device has been changed from the 2N1814 to the 2N2762 transistor. A program of step stress testing has been developed as a method of demonstrating an improvement in the reliability of the contract device. All process improvement and equipment modifications are completed in preparation for the production run.

AD-611 218 Div. 8, 26
CFSTI Prices: HC$2.00 MF$0.50

Cornell-Dubilier Electronics Div., Federal Pacific Electric Co., Norwood, Mass.
PRODUCTION ENGINEERING MEASURE FOR CAPACITORS, FEED-THROUGH, SOLID ELECTROLYTE TANTALUM PELLET.
Quarterly rept. no. 3, 1 Oct-31 Dec 64,
by W. G. Bailey. 31 Dec 64, 33p
Contract DA36 039AMC03630E
Unclassified report

See also AD-608 812.

Descriptors: (*Tantalum capacitors, Manufacturing methods), Electrolytic capacitors, Life expectancy, Design, Environmental tests, Performance (Engineering), Aging (Materials), Electrical impedance.

Re-aging of Group II Engineering Samples was completed. Surviving units were submitted to Quality Control for low impedance life test and other required tests. Test data was submitted for all tests. Manufacturing of preproduction samples was initiated during this quarter. Four lots, totaling 650 anode starts, were started. Additional purchase orders were placed for parts to complete the 650 anode starts. At the close of this quarter, three lots were completely assembled (450 anode starts) and two lots (300 anode starts) were started on aging in accordance with Modification No. 2 of the contract. Minor modifications were made on the anode wire positioning fixture during processing of the preproduction samples. Aging trays and fuse blocks were fabricated for aging of the preproduction samples. The insertion loss test fixture was mounted on an arbor press for increased ease and speed of making insertion loss measurements.

AD-611 219 Div. 8, 26
CFSTI Prices: HC$1.00 MF$0.50

Erie Technological Products, Inc., Pa.

PRODUCTION ENGINEERING MEASURE FOR RESISTOR-CAPACITOR MICROELEMENTS FOR MICROMODULES.
Quarterly rept. no. 6, 26 Sep-25 Dec 64,
by J. E. Schupp. 25 Dec 64, 17p
Contract DA36 039AMC01479E

Unclassified report

See also AD-608 580.

Descriptors: (*Modules (Electronic), Microminiaturization (Electronics)), (*Capacitors, Manufacturing methods), (*Resistors, Manufacturing methods), (*Microminiaturization (Electronics), Modules (Electronics)), Encapsulation, Reliability (Electronics), Tests, Performance (Engineering).

The manufacturing of all preproduction microelements was completed. Encapsulation of microelements into micromodules and preproduction tests was completed for 1-100 pf capacitor + 4-500 ohm resistors and 2-10 pf capacitors + 2-500 ohm resistors. Preproduction tests (Group 1) were completed for 1-620 pf capacitor + 4-100,000 ohm resistors.

AD-611 220 Div. 8, 9, 25
CFSTI Prices: HC$2.00 MF$0.50

Space Sciences Lab., General Electric Co., Philadelphia, Pa.
EFFECT OF TURBULENCE INTERMITTENCY ON THE SCATTERING OF ELECTROMAGNETIC WAVES BY UNDERDENSE PLASMAS.
Technical information series,
by K. T. Yen. Nov 64, 48p Rept. no. R64SD72
Contract AF04 694 474

Unclassified report

Descriptors: (*Electromagnetic waves, Scattering), (*Plasma medium, Turbulence), (*Wake, Turbulence), Electron density, Radar echo areas, Correlation techniques, Numerical analysis, Distribution, Tables.

In hypersonic turbulent wakes, mixing between the turbulent inner wake and the outer inviscid wake gives rise to the 'intermittency' phenomenon. It is shown that electron-density fluctuations of a turbulent nature, in addition to those caused by 'turbulence', will be produced by the intermittency phenomenon. These additional fluctuations depend on the mean electron-density distribution and Townsend's intermittency function. Application of the above consideration to turbulent scattering by underdense plasma was made. Two contributions to the scattering cross section are obtained: The first one arises from the intermittency phenomenon and vanishes if the intermittency is omitted; and the second one is due to fluctuations caused by 'turbulence'. This second contribution also contains the intermittency effect, and reduces to that given by the conventional turbulent scattering theory when the intermittency is not considered. Numerical results for the scattering cross section were obtained by using correlation functions and mean electron-density distribution of the Gaussian form. Based on these results, some characteristics of the scattering cross section such as its aspect-angle and frequency dependence are found to be significantly modified by the intermittency. (Author)

AD-611 270 Div. 8
CFSTI Prices: HC$4.00 MF$1.00

Sperry Gyroscope Co., Great Neck, N. Y. Radiation Div.
CIRCUITED AMPLIFIER DEVELOPMENT.
Final rept.
Jan 65, 132p Rept. no. EB-5296-0542
Contract AF30 602 3102, Proj. 4506, Task 450603
RADC TDR-64-497

Unclassified report

See also AD-437 299.

Descriptors: (*Radiofrequency amplifiers, Ultrahigh frequency), (*Tuned amplifiers, Radiofrequency amplifiers), Modules (Electronic), Phased arrays, Tetrodes, Radar transmitters, Ceramic capacitors, Radiofrequency power, Modulators, Cavity resonators, Broadband, Life expectancy, Costs, Maintainability.

The development of an inexpensive circuited amplifier chain has been investigated. The chain is to be capable of peak power outputs of up to 100 kw at UHF (432 mc) with broadband (40 mc) capabilities. Flatplate and stripline cavity construction, and new techniques in fabricating inexpensive d-c blocks and bypass capacitors were investigated. Tube types were evaluated for life and performance versus cost tradeoffs. Ease of maintenance coupled with high component and amplifier reliability were major points of consideration. All unique features and technical advances were oriented to be compatible with mass production techniques providing phased-array cavity hardware at minimum cost. (Author)

AD-611 276 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
INDUCTANCE EFFECTS IN ENERGY DIVERTER DISCHARGE CIRCUITS,
by George W. Taylor and Sol Schneider. Nov 64,
17p Technical rept. no. ECOM-2529
Proj. 1P6 22001A055, Task 1P6 22001A055 02

Unclassified report

Descriptors: (*Electronic switches, Electric discharges), (*Switching circuits, Electronic switches), Inductance, Trigger circuits, Voltage, Oscillation, Electronics, Electrical impedance, Energy, Delay circuits.

The effectiveness of energy-diverter protection can be reduced by the presence of inductance between the energy diverter and the 'protected system'. Two primary effects caused by inductance have been noted. The first effect occurs when the fault-sensing circuit triggers the energy-diverter during a high-impedance fault. In this case a large voltage oscillation about the zero reference level appears at the 'protected system'. If the inductance is large, the oscillation will be maintained for a long period and will prevent quick removal of voltage. The second effect occurs when the fault-sensing circuit triggers the energy diverter during a low-impedance arc. In this case the large inductance retards arc quenching. As the arc attempts to quench, the voltage oscillation reappears because of the energy stored in the inductor, and arc quenching is prevented. Observations on a system and an analysis of the circuit are discussed. (Author)

AD-611 277 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
HYDROGEN CLEANUP,
by Sol Schneider, John E. Creedon, and Norman L. Yeamans. Nov 64, 22p Technical rept. ECOM-2528
Proj. 1P6 22001A055, Task 1P6 22001A055 02

Unclassified report

Descriptors: (*Discharge tubes, Hydrogen), (*Hydrogen, Discharge tubes), Performance (Engineering), Gas discharges, Pressure, Transients, Deformation, Nickel, Thyratrons, Diodes (Electron tubes), Triodes, Absorption (Physical), Tritium, Tracer studies, Voltage.

In hydrogen-discharge experiments and in the design of hydrogen-filled devices, the influence of the discharge on the equilibrium state of the hydrogen-metal system in the container requires careful consideration. Contrary to normal expectations, the heat of the discharge does not increase the observed molecular gas pressure according to the equations of state for homogenous systems. Instead, a temporary pressure decrease occurs. This anomalous behavior is caused by the interaction of the discharge products with the hydrogen-metal system surrounding the discharge. The phenomenon has been studied in several structures. The discharge parameters were varied from steady state to very narrow pulse conditions over a wide range of voltage and current. Analysis of the data reveals that an intimate relationship exists between the power dissipated in the discharge and the establishment of a new equilibrium state for the hydrogen-metal system. Spectroscopic measurements show that this is due to the generation of atomic hydrogen in the discharge and that the anomalous behavior is due to a depletion of the atomic gas. The experimental techniques, the fundamental relationships, the theoretical considerations, the influence of the physical state of the nickel, and the long-term effects are discussed. (Author)

AD-611 278 Div. 8
CFSTI Prices: HC$2.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
A FORESHORTENED CENTER-FED WHIP ANTENNA,
by Watson P. Czerwinski. Jan 65, 27p
Technical rept. no. ECOM-2549
Proj. 1P0 14501B31A, Task 1P0 14501B31A00
Unclassified report

Descriptors: (*Dipole antennas, Antenna feeds), Design, Very high frequency, Helixes, Performance (Engineering), Bandwidth, Effectiveness, Circuits, Electrical impedance, Capacitance, Inductance.

An experimental investigation was conducted to determine whether the degradation in electrical performance commonly observed with reduced-height helical-wound vertical dipoles can be avoided. A new design approach has been explored which helped define a major cause of this degradation. Data obtained during this investigation supports a working hypothesis that losses associated with circulating currents in the capacitance between turns of a helically wound, electrically short vertical dipole greatly reduce antenna bandwidth and efficiency. A six-foot-high experimental model was constructed and tested as a replacement for the 10-foot whip of Antenna AS-1729( )/VRC. The design of this foreshortened model minimized circulating current losses throughout the operating band of 30 to 76 Mc and resulted in an average efficiency of 90% compared to the 10-foot whip. (Author)

AD-611 284 Div. 8, 26
CFSTI Prices: HC$3.00 MF$0.75

Hamilton Standard Div., United Aircraft Corp., Broad Brook, Conn.
ENHANCED MICRO-MODULE INTERCONNECTIONS. AN HERMETIC PACKAGING SYSTEM FOR THE INTEGRATION OF MICRO CIRCUITS.
Quarterly rept. no. 5, 1 Jul-30 Sep 64,
by R. Collins and D. J. Garibotti. 30 Sep 64, 70p
Rept. no. HSER-3053, SCL-7686
Contract DA36 039AMC03620E
Unclassified report

Rept. on Production Engineering Measure. See also AD-432 492.

Descriptors: (*Integrated circuits, Manufacturing methods), (*Packaged circuits, Integrated circuits), Microminiaturization (Electronic), Modules (Electronic), Electron beams, Welding, Semiconductor devices, Machines, Processing Electroplating, Vacuum apparatus, Vapor plating, Bonding, Electric connectors.

The adaptation of previously developed techniques into manufacturing processes has been successfully completed. These processes were subjected to operation checkouts to establish compatibility with the objective of the programs which is to establish production capability of manufacturing the Enhanced Micro Modules on a pilot line basis at the rate of 100 units per eight hour shift. The proposed Microwafer Design Guide, the preliminary cost analysis of the completely assembled Enhanced Micro Modules and a manual describing the Inspection and Quality Control Procedures to be used in the production of the Engineering Model Design Modules were prepared. All equipment necessary in the fabrication of microwafers have been installed and subjected to operational checkouts. The machines which will be used in the assembly of the Enhanced Micro Modules have been installed and developed into operational units. The design and construction of a semi-automatic wafer inspection machine was completed. (Author)

AD-611 285 Div. 8, 25
CFSTI Prices: HC$3.00 MF$0.75

Microwave Associates, Inc., Burlington, Mass.
APPLICATION OF SEMI-CONDUCTOR DEVICES TO HIGH POWER DUPLEXERS.
Quarterly rept. no. 2, 1 Jul-30 Sep 64,
by Paul Basken. Jan 65, 54p
Contract AF30 602 3278, Proj. 5573, Task 557304
RADC TR-64-518
Unclassified report

See also AD-609 213

Descriptors: (*Semiconductor devices, Radar duplexers), (*Radar duplexers, Semiconductor devices), (*Switching circuits, Diodes (Semiconductor)), C Band, Microwave equipment, Transmission lines, Radio-frequency power, Phase shifters, Phase shift, Performance (Engineering).

Experiments were performed to determine configurations of TR and ATR structures loaded with many diodes. Although the optimum configuration did not evolve so far, much was learned for use in the final design. Specifically, the geometry of coaxial structures where diodes are mounted radially for equal power sharing, and the location of diodes from the main transmission line were pin-pointed. The results were somewhat better for the TR configuration in terms of bandpass and loss per unit of incident power, but this is not considered finalized at this stage of the program. Experimental results were also obtained on the phase shift duplexer approach. The phase shift per section achieved was about 2 degrees whereas about twice that would be desirable. The duplexer capability achieved in these initial attempts is given. This capability is based on calculation, and was not actually measured. It is a guide, however, to future improvements. (Author)

AD-611 309 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Laboratory for Electroscience Research, New York Univ., N. Y.
A NOTE ON SELECTION OF A CHANNEL MODEL.
by John J. Metzner. Dec 64, 24p
Scientific rept. no. SR-1, Technical rept. no. TR-400-103
Contract AF19 628 4321, Proj. 4610, Task 461003
AFCRL 65-19

Unclassified report

Descriptors: (*Communication systems, Mathematical models), (*Mathematical models, Selection), Coding, Probability, Communication theory, Feedback, Errors.

The finite-state channel model assumed in Shannon's noisy channel theorem yields the conclusion that error probability can be reduced exponentially with code length at any information rate less than channel capacity. Evidence from statistics of real channels suggests, however, that this exponential behavior is not achievable for any code duration which might conceivably be used in practice. This report exhibits an infinite-state model which leads to a somewhat different conclusion about what can be accomplished with coding than would be reached with a finite-state model; namely, that error probability can be reduced only as a small power of code length. (Author)

AD-611 338 Div. 8, 25
CFSTI Prices: HC$4.00 MF$0.75

Texas Univ., Austin. Quantum Electronics Research Lab.
QUANTUM ASPECTS OF ELECTRICAL SCIENCE.
Final rept. for 1 Apr-30 Sep 64,
by Arwin A. Dougal. 1 Oct 64, 104p
Grant AF AFOSR487 64
AFOSR 65-0248

Unclassified report

Descriptors: (*Resonators, Lasers), (*Germanium, Cryogenics), (*Diffraction analysis, Microscopes), (*Lasers, Power), (*Transistors, Electric discharges), Coupling circuits, Intensity, Modulation, Light, Mirrors, Electric currents, Conductivity, Density, Semiconductors, Photomicrography, Diffraction, Mirrors, Images, Helium, Neon, Mathematical models, Atomic energy levels, Electron transitions, Spectra (Visible and Ultraviolet), Excitation, Oscillation, Reflection, Gases.

An experimental and analytical study of the characteristics of coupled optical resonators is presented. The concept of an equivalent laser resonator is introduced and employed in an analysis of coupled resonator systems. Qualitative results from such an analysis agree with the experimental results presented. A dual wavelength beam switching phenomena involving coupled resonators is also reported. Experimental results are presented of a study of thermal pinching in germanium. Thermal pinching is a result of thermal breakdown in a semiconductor sample immersed in a constant temperature medium. Incremental negative resistance is observed in the thermal pinched condition. A comparison of the imaging properties of coherent laser light and white light is presented. Photomicrographs are presented illustrating the difference in diffraction images occurring in a phase contrast microscope due to the two sources. Results of an experimental study of the output power characteristics of a 3.39 microns He-Ne laser system are reported. By optimizing the parameters of the system, a maximum output of 16 mw was obtained on a pulse basis, while up to 10 mw was obtained on a continuous basis. (Author)

AD-611 340 Div. 8

Pacific Naval Lab., Esquimault (British Columbia).
MAN-MADE ELECTROMAGNETIC INTERFERENCE AT EXTREMELY LOW FREQUENCIES,
by J. E. Lokken and J. A. Shand. 27 May 64, 8p
Reprint-64-6

Unclassified report

Pub in Canadian Journal of Physics v42 p1902-07 Oct 1964 (Copies available only to DDC users).

Descriptors: (*Signals, Extremely low frequency), (*Extremely low frequency, Signals), (*Interference, Extremely low frequency), Canada, Noise, Electromagnetic waves, Measurement, Bandwidth, Modulation, Magnetic fields, Propagation.

In the electromagnetic spectrum between 6 and 36 c.p.s. several classes of manmade noise have been observed in rural areas adjacent to cities. Their probable sources are suggested. In many Canadian semirural areas this interference, though appreciable, is not sufficient to prevent reception of natural electromagnetic background, most of which is believed to originate with tropical lightning and to be propagated as Schumann resonance modes in the earth-ionosphere cavity. (Author)

AD-611 399 Div. 8, 26
CFSTI Prices: HC$7.00 MF$1.75

RCA Defense Electronic Products, Camden, N. J.
PRODUCTION ENGINEERING MEASURE.
MICROMODULES.
Formal engineering rept.
Jan 65, 308p
Contract DA36 039SC75968, Tasks 36, 39

Unclassified report

Rept. on Micromodule Program Extension II. See also AD-608 775.

Descriptors: (*Modules (Electronic), Microminiaturization (Electronics)), (*Microminiaturization (Electronics), Modules (Electronic)), Manufacturing methods, Feasibility studies, Electronic equipment, Production, Reliability (Electronics).

This report describes the effort conducted under tasks 36 and 39 of the Extension II (Production Engineering Measure) phase of the contract. Tasks 36 and 39 provided for the analysis of processes, designs, and production techniques which would be compatible with the implementation of a full-scale pilot production line for micromodule assembly. The objective of Task 36 was to provide a module assembly facility capable of a balanced production rate of 200 modules per 8-hour day, by proceeding, sequentially, through process analysis, facilitation and fabrication of preproduction modules to establish the adequacy of the implemented facility. Task 39 was to demonstrate, through a pilot run phase, the capability of the facilities established during the preproduction phase. Three module sources were selected and facilitated to perform under Tasks 36 and 39. The facilities implemented and demonstrated by each of the three fabricators were considered to have met all task objectives. Each fabricator demonstrated the required minimum production-rate capability of 200 modules per 8-hour shift. The results of the three independent pilot runs confirmed the adequacy of the selected module assembly processes and the implementation choices made by each fabricator. Each vendor produced a pilot run quantity of 1000 micromodules to be used for a 10,000-hour reliability test performed on another Army contract.

AD-611 402 Div. 8
CFSTI Prices: HC$3.00 MF$0.75

Sperry Electronic Tube Div., Sperry Rand Corp., Gainesville, Fla.
SHAPED FIELD HOLLOW BEAM ELECTRON GUNS FOR INTERMEDIATE AND HIGH POWER TRAVELING WAVE TUBES.
Interim engineering rept. no. 3, 1 Nov 64-1 Feb 65. Feb 65, 61p Sperry rept. no. NJ-2761-0173-3
Contract AF33 615 1501, Proj. 4156, Task 415603
Unclassified report

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See also AD-444 754.

Descriptors: (*Electron guns, Traveling-wave tubes), (*Traveling-wave tubes, Electron guns), Anodes (Electron tubes), Magnetic fields, Gain, Electron beams, Programming (Computers), Electric fields, Performance (Engineering), Numerical analysis.

Experiments with the multi-segment electron gun are made with no anode bias and with anodes biased linearly and parabolically. Biasing of the anodes produced beams more nearly in accordance with the objectives. It is found that positive flux linkage is very desirable. Electrolytic tank studies which modeled the anode biases used have shown that a portion of the cathode was subject to a negative electric field and thus cutoff. The computer program for gun analysis is essentially complete and is described in detail. Theoretical studies show that positive flux linkage favors rapid turning of electrons toward the exit end of the gun. It is also shown that shaping of the electric field so as to create an electric force toward the exit end of the gun results in a continuous variation in cathode current density, the density decreasing with increasing distance from the exit end of the gun. (Author)

AD-611 413 Div. 8, 26
CFSTI Prices: HC$2.00 MF$0.50

Clevite Corp., Bedford, Ohio.
PRODUCTION ENGINEERING MEASURE FOR CERAMIC FILTERS.
Quarterly rept. no. 7, 30 Sep-29 Dec 64, by A. Lungo. 29 Dec 64, 28p
Contract DA36 039AMC01471E
Unclassified report

See also AD-608 465.

Descriptors: (*Ceramic materials, Filters (Electromagnetic wave)), (*Filters (Electromagnetic wave), Ceramic materials), Resonators, Tuning devices, Machining, Packaging, High frequency, Manufacturing methods, Disks, Electric filters, Resonance.

Tumble grinding appears to be an acceptable production technique for tuning small ceramic resonators resonant above 1 Mc. However, it will have to be supplemented by frequent sampling of the resonant frequencies and considerable sorting of resonators falling within the desired frequency range. The use of helical compression springs in the ladder filter assembly will eliminate the major packaging problem. This problem has been traced to inadequate control of contact forces. The use of helical springs will provide greater reliability and more consistent filter selectivity characteristics after packaging. (Author)

AD-611 415 Div. 8, 15
CFSTI Prices: HC$2.00 MF$0.50

Washington Univ., Seattle. Coll. of Engineering.
THE MODIFIED ANGER AND LOMMEL-WEBER FUNCTIONS,
by Yung-Sen Chen and Akira Ishimaru. Nov 64, 27p
Technical rept. no. TR-91
Contract AF19 628 2763, Proj. 5635, Task 563502
AFCRL 64-969
Unclassified report

See also AD-602 237.

Descriptors: (*Special functions (Mathematical), Electromagnetic waves), (*Antenna configurations, Special functions (Mathematical)), Integrals, Series, Differential equations, Integral transforms, Identities, Bessel functions, Antenna radiation patterns, Mathematical logic.

The Modified Anger and Lommel-Weber Functions are encountered in the study of antennas and electromagnetic waves. In this report, a detailed study of the above functions is presented. The differential equations satisfied by these functions, recursion formulae and identities are derived. The series expansions, the asymptotic expansions for large arguments and the integrals expressible in terms of these new functions are given.

AD-611 416 Div. 8, 4, 14, 25
CFSTI Prices: HC$3.00 MF$0.75

Korad Corp., Santa Monica, Calif.
INORGANIC LASER MATERIALS.
Interim engineering rept. for 1 Aug-30 Nov 64, 21 Dec 64, 55p
Contract AF33 615 1967
Unclassified report

Descriptors: (*Lasers, Crystals), (*Crystals, Inorganic compounds), Synthesis (Chemistry), Crystal growth, Purification, Impurities, Cadmium compounds, Oxides, Lanthanum compounds, Aluminum compounds, Magnesium compounds, Beryllium compounds, Neodymium, Spectroscopy, Performance (Engineering), Sorption, Spinels.

The objective of this program is the development of laser materials. Laser action has been with two host unary oxides (Gd203 and La203) doped with Nd+(+3), emphasis is now being placed on the improvement of their crystal quality and performance efficiency, as well as an extension of these studies to other primary additives. In the case of the host binary oxides, theoretical and experimental research is currently being conducted to evaluate GdAlO3, MgO.Al2O3, and BeO.Al2O3 as laser hosts. To cope with the manifold problems associated with crystal growth of polynary oxides, a simultaneous study of hybridized growth techniques is accompanying this activity.

AD-611 436 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Lincoln Lab., Mass. Inst. of Tech., Lexington.
HAYSTACK CALIBRATION ANTENNA,
by Arthur Sotiropoulos and John Ruze.
15 Dec 64, 19p Technical rept. no. TR-367
Contract AF19 628 500
ESD TDR-64-588
Unclassified report

Descriptors: (*Horn antennas, Calibration), (*Parabolic antennas, Calibration), Gain, Radio astronomy, Radar antennas, Errors, Performance (Engineering), Superhigh frequency, Ultrahigh frequency.

The gain of a horn-reflector antenna with an aperture of 65.30 square feet has been measured over a frequency range of 2.7 to 16.0 Gcps. This report describes the experimental measurements, the data with best-fit curves, and a linear regression analysis which permits confidence limits to be set on the gain estimate. (Author)

9. Fluid Mechanics

AD-610 858 Div. 9
CFSTI Prices: HC$2.00 MF$0.50

TRW Space Technology Labs., Redondo Beach, Calif.
PRELIMINARY STUDY OF THE VISCOUS INVISCID INTERACTION IN THE LAMINAR SUPERSONIC NEAR WAKE,
by W. H. Webb, R. J. Golik, and Lester Lees.
Jul 64, 44p 6453-6004-KU-000
Contract AF04 694 440
BSD TDR64 114

Unclassified report

Descriptors: (*Laminar boundary layer, Mathematical analysis), (*Wake, Laminar flow), Supersonic flow, Two-dimensional flow, Stagnation point, Heat transfer, Integral equations, Differential equations, Shear stresses.

An attempt is made to determine in a simple way the nature of the interaction of merging supersonic shear layers with an external inviscid flow in the heat conducting laminar near wake. For this purpose, a solution of the two-dimensional boundary layer equations using a two-moment integral method is examined. Several sample calculations of base flow are given which enable an evaluation of the Chapman model of instantaneous recompression. Also, a comparison is made with the earlier solution of Lees and Reeves for the adiabatic case in which Stewartson profiles were used. Despite the simplicity of the present analysis, good agreement is found for axis velocity ratios greater than -0.1; it is therefore concluded that the solution is not sensitive to assumed profile shape near and beyond the stagnation point. However, the importance of an adequate profile representation for the flow near the body is clear and the extension of the methods used herein to incorporate this improvement is discussed.

AD-610 868 Div. 9, 15, 22
CFSTI Prices: HC$3.00 MF$0.75

Cornell Univ., Ithaca, N. Y. Graduate School of Aerospace Engineering.
ON THE SIMILAR SOLUTIONS OF STRONG BLAST-WAVES AND THEIR APPLICATION TO STEADY HYPERSONIC FLOW,
by Eric F. Brocher. Apr 61, 85p
Contract AF49 638 544
AFOSR 580; PB 157 640

Unclassified report

Descriptors: (*Shock waves, Numerical analysis), (*Hypersonic flow, Shock waves), Blast, Energy, Slender bodies, Conical bodies, Wedges, One-dimensional flow, Pressure, Drag, Theory, Functions.

The exact 'constant-energy' solution of strong blast waves is expanded in powers of the density ratio across the shock wave; physical quantities are expressed directly as functions of the similitude parameter. The range of validity for the application of this solution to hypersonic flow is then studied as a function of the density ratio. The general similar solution of the strong blast wave is found in the Newtonian approximation. The results are applied to power-law bodies in hypersonic flow using the equivalence principle. The pressure distribution on slender bodies of arbitrary shape is obtained and agrees with the Newton-Busemann pressure formula. Higher-order approximations are derived for the cases in which the shock layer is thin. A simple pressure formula is obtained and some of its applications are shown. (Author)

AD-610 882 Div. 9
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ELECTRICAL DISCHARGES IN CAVITATION,
by V. A. Konstantinov. 3 Nov 53, 4p T-104-R
TT 65-61632

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1947, v. 56, no. 3, p. 259-260.

Descriptors: (*Cavitation, Electric discharges), (*Electric discharges, Cavitation), Ultrasonic radiation, Hydrodynamics, Luminescence, Oxidation, Bubbles, Pressure, USSR.

It was experimentally established that electrical discharges are formed under the influence of hydrodynamic cavitation. These discharges appear in the collapse of the vapor-and-gas bubbles in the region of reduced pressure. The development of the discharges depends both on the cavitation-regime and on the dimensions of the experiment. The probable cause of erosion is the direct action of the electrical discharges and the chemical processes connected with them.

AD-611 018 Div. 9, 1
CFSTI Prices: HC$3.00 MF$0.75

David Taylor Model Basin, Washington, D. C.
PREDICTION OF THE AERODYNAMIC CHARACTERISTICS OF ANNULAR AIRFOILS,
by W. B. Morgan and E. B. Caster. Jan 65, 91p
Rept. no. 1830
Proj. SR011 01 01, Task 0401

Unclassified report

Descriptors: (*Airfoils, Aerodynamic characteristics), (*Shroud rings, Aerodynamic characteristics), Aerodynamic loading, Propeller blades, Shrouded propellers, Mathematical prediction, Boundary layer, Programming (Computers), Axially symmetric flow, Angle of attack, Vortices, Lift, Drag, Moments, Integral equations, Theory.

A computer program is presented which calculates the aerodynamic characteristics of annular airfoils on an IBM-7090 high-speed computer. A brief review of the theory is also presented. Experimental and computer results indicate that the theory gives reasonable prediction of the lift, induced-drag, and moment coefficients and also of the pressure distribution except when separation is present on the annular airfoil. The computer program can also be used for the design of ducted propellers if an infinite number of blades is assumed. (Author)

AD-611 050 Div. 9
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
METHOD OF ACCELERATING A GAS FLOW TO HYPERSONIC VELOCITIES WITH THE AID OF A JET NOZZLE,
by M. D. Ladyzhenskii. 28 Jan 65, 5p FTD-TT-64-871
TT 65-61697

Unclassified report

Unedited rough draft trans. of Russian patent 153153, appl. no. 758767/25-8, 10 Jan 62.

Descriptors: (*Gas flow, Acceleration), (*Hypersonic nozzles, Design), Hypersonic flow, Boundary layer, Jets, Patents.

A method was devised for accelerating a gas flow to hypersonic velocities with the aid of a jet nozzle. To reduce the harmful effect of the boundary layer, the flow is sharply expanded by increasing the through section of the nozzle behind its initial section, producing deep rarefaction at flow output. (Author)

AD-611 059 Div. 9, 27
CFSTI Prices: HC$2.00 MF$0.50

Gas Turbine Lab., Mass. Inst. of Tech., Cambridge.
HOMOGENEOUS NUCLEATION OF SUPERSATURATED WATER VAPOR IN NOZZLES,
by Philip G. Hill. Jan 65, 44p Report no. 78,
Contract Nonr396307
Unclassified report

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See also AD-608 161.

Descriptors: (*Supersonic nozzles, Water vapor), (*Water vapor, Nucleation), (*Nucleation, Water vapor), Condensation, Drops, Surface tension, Cloud chambers.

Existing data on the condensation of steam and moist air in supersonic nozzles are compared with predictions based on nucleation and drop growth theory. The effects of uncertainties in cluster surface energy and also of the large corrections to nucleation theory due to the 'gasification' concept are examined. It is concluded that if the surface tension is assumed independent of curvature and the classical liquid drop theory (based on a stationary liquid drop) is used, the theory is in general agreement with the data. The gasification correction is in accord with experimental data only if the surface tension is considered to rise significantly with curvature (as predicted by Oriani and Sundquist and others). In neither case can the Tolman or Kirkwood-Buff equations be supported. A review of existing data shows that there is some question as to the appropriate value of the condensation coefficient but this is of little consequence as long as the accommodation coefficient for the liquid-vapor surface is taken to be unity. (Author)

AD-611 063 Div. 9
CFSTI Prices: HC$4.00 MF$1.00

Kaye (Joseph) and Co., Cambridge, Mass.
HEAT, MASS, AND MOMENTUM TRANSFER BETWEEN A HIGH VELOCITY LIQUID JET AND A CONCENTRIC GAS STREAM IN AN AXISYMMETRIC CHANNEL,
by S. William Gouse, Jr., and John H. Leigh.
22 Jan 65, 137p Rept. no. 67
Contract N140 122 76725B
Unclassified report

Descriptors: (*Liquid jets, Transport properties), (*Axially symmetric flow, Transport properties), Momentum, Jet mixing flow, Pressure, Velocity, Numerical analysis, Differential geometry, Fluid dynamic properties, Heat transfer, Heat transfer coefficients, Thermodynamics, Atomization.

The study began with an effort to determine whether the liquid stream entering the mixing section of an ejector-like device remained intact in a jet or atomized. The conclusions were that for the range of varibles of interest the probability was that there was no significant jet breakup. Possible entrainment of liquid by the concentric gas stream has been neglected at this time. Having established an analytical model based on the assumption that the liquid stream remains intact, the basic equations were numerically solved for a variety of conditions. Using the axial distance reauired to condense the vapor from the concentric gas stream on to the liquid jet as a measure of performance, (the shorter the better), it was found that:
A constant pressure converging mixing section is more effective than a constant area mixing section.
Increasing the number of liquid jets (constant total jet flow area) shortened the mixing section.
Increasing the Mach number of the gas stream at the mixing section inlet shortened the mixing section.
The amount of noncondensable present in the gas stream (from 20 to 50 percent by weight) did not significantly affect the distance required for condensation but did affect the shape of the mixing section. (Author)

AD-611 067 Div. 9
CFSTI Prices: HC$3.00 MF$0.50

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
FORCES AND MOMENTS ON AN OSCILLATING HYDROFOIL WITH AN OSCILLATING FLAP,
by John M. Grace and Irving C. Statler. Jan 65,
52p Rept. no. CAL-BB-1798-S-1
Contract NObs88342, Proj. SS600 000, Task 1719
Unclassified report

See also AD-285 447.

Descriptors: (*Hydrofoils, Oscillation), (*Hydrodynamic configurations, Hydrofoils), Fluid dynamic properties, Lift, Moments, Two-dimensional flow, Algebra, Boundary value problems, Integral equations, Pitch (Motion).

This report presents the results of a theoretical study to determine the lift, total moment and hinge moment acting on a fully wetted, oscillating hydrofoil with an oscillating flap in two-dimensional, linearized, potential flow. The flow was assumed to be noncavitated, but no limitations were placed on the values of Froude number or depth-to-chord ratio. The solution takes full account of the surface waves caused by the hydrofoil motion. Results are presented in graphical and tabular form. Lift, total moment, and hinge moment are given as functions of reduced frequency with Froude number, depth-to-semichord ratio and hinge position as parameters. (Author)

AD-611 073 Div. 9
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
VELOCITY AND TEMPERATURE DISTRIBUTION IN A TURBULENT BOUNDARY LAYER ON A PLATE,
by L. I. Zhyugzhda and V. I. Makaryavichyus.
28 Jan 65, 10p FTD-TT-64-800
TT 65-61687
Unclassified report

Unedited rough draft trans. of Akademiya Nauk Litovskoi SSR, Vilna. Trudy. Seriya B, 1963, no. 3(34), p. 99-105.

Descriptors: (*Turbulent boundary layer, Analysis), (*Oils, Turbulent boundary layer), Structural parts, Velocity, Temperature, Distribution, Cooling, Heating, USSR.

Velocity and temperature distribution was experimentally determined in a turbulent boundary layer of a heated and cooled plate in a channel with constant and decreasing through section in streams of transformer oil and water.

AD-611 100 Div. 9, 4, 12
CFSTI Prices: HC$3.00 MF$0.75

TRW Space Technology Labs., Redondo Beach, Calif.
TURBULENT DIFFUSION OF A REACTING WAKE. Revised ed.,
by Wilmot H. Webb and Leslie A. Hromas. 3 Dec 64, 52p 6453-6012-KU-000
Contract AF04 694 440
BSD-TR-64-342

Unclassified report

Presented at AIAA Annual Meeting, 30 Jan 64. Revision of rept. dated 30 Jan 64.

Descriptors: (*Wake, Reaction kinetics), (*Reaction kinetics, Atmosphere entry), (*Atmosphere entry, Reaction kinetics), (*Turbulence, Wake), Diffusion, Ionization, Hypersonic flow, Nonequilibrium flow, Blunt bodies, Slender bodies, Conical bodies, Contamination, Chemical reactions, Aerodynamic configurations.

Properties of the nonequilibrium hypersonic turbulent wake have been calculated from an integral solution for the coupled diffusion of mass and energy. Emphasis is placed on: a comparison of a slender body calculation from the present simple method with results obtained for the same case by more advanced mathematical techniques such as finite difference methods; new blunt body results in which the reacting inviscid flow is entrained by the turbulent inner wake; the effect of contaminants on both slender and blunt body wakes; and a comparison of the present calculations with ballistic range measurements for wake velocity and electron density.

AD-611 108 Div. 9
CFSTI Prices: HC$1.00 MF$0.50

Aerospace Technology Div., Library of Congress, Washington, D. C.
DIFFUSERS WITH TRANSVERSE FINS (TRANSLATIONS AND EXCERPTS OF 3 ARTICLES),
by V. K. Migai. 14 Jan 63, 16p AID-T-63-8
TT 65-61738

Unclassified report

Trans. of Energomashinostroenie (USSR) 1960, v. 6, no. 4, p. 31; Teploenergetika (USSR) 1961, v. 8, no. 4, p. 41-43 (excerpts); 1962, v. 9, no. 10, p. 55-59.

Descriptors: (*Diffusers, Fins), Fluid flow, Ducts, Vortices, Heat transfer, Design, Cylindrical bodies, Mathematical analysis, Performance (Engineering), Fluid mechanics, USSR.

The articles concern a method for increasing the efficiency of diffusers by means of transverse fins cut in the walls of the normal smooth diffuser.

AD-611 126 Div. 9
CFSTI Prices: HC$1.00 MF$0.50

Avco-Everett Research Lab., Everett, Mass.
ENTROPY BOUNDARY LAYERS,
by S. Weinbaum. Jan 65, 16p Research rept. no. RR-207
Contract AF04 694 414
BSD TDR-64-165

Unclassified report

Subcontracted to Bell Telephone Labs., Inc., Whippany, N. Y., Contract DA30 069ORD1955.

Descriptors: (*Boundary layer, Entropy), (*Thermodynamics, Boundary layer), Enthalpy, Vortices, Supersonic flow, Subsonic flow, Aerodynamic characteristics, Mathematical analysis, Stagnation point, Shock waves, Motion, Equations, Jets.

Crocco's equation for the entropy gradients in an inviscid compressible flow is extended to flows with viscosity and conductivity using the boundary layer equations of motion. The general structure of the entropy boundary layer is discussed and entropy profiles are presented for the Pr = 1 boundary layer using 'cold', 'hot' and adiabatic wall conditions at several representative subsonic and supersonic Mach numbers. For an adiabatic wall the entropy profile has an inverse boundary layer structure in velocity coordinates, the greatest variation occurring near the outer edge of the boundary layer, while the entropy near the wall is essentially constant. For 'cold' wall conditions total enthalpy gradients and vorticity have opposing effects, and the entropy profile can have a maximum provided M at infinity exceeds a minimum critical value. Entropy is a convenient state variable with which to express the variation of vorticity and total enthalpy in a supersonic boundary layer prior to a rapid expansion or separation and can be used to describe these two phenomena in much the same manner that entropy is presently used to describe the flow behind a curved shock wave. (Author)

AD-611 132 Div. 9
CFSTI Prices: HC$3.00 MF$0.75

Princeton Univ., N. J.
A GRAPHITE RESISTANCE HEATER FOR A HYPERSONIC WIND TUNNEL USING NITROGEN.
Final rept.,
by R. P. Shreeve, W. T. Lord, S. J. Boersen, and S. M. Bogdonoff. Jun 61, 54p Rept. no. 560
Contract AF49 638 709
AFOSR 1028; PB 158 424

Unclassified report

Descriptors: (*Heaters, Hypersonic wind tunnels), (*Hypersonic wind tunnels, Heaters), (*Graphite, Heaters), Nitrogen, Gases, Coatings, Heating elements, Thermodynamics, Resistance (Electrical), Temperature.

A heater system has been developed for a hypersonic wind tunnel which uses nitrogen as the test gas and can operate continuously at Mach numbers up to 20. The major problems encountered in the development of the wind tunnel have been caused by chemical reactions in the heater involving substances other than pure nitrogen and pure graphite. A thin impermeable coating of pyrolytic graphite over the outside of the heater element has prevented the formation of holes in the outer wall, which occurred earlier using uncoated elements. Such coated elements have regularly been used to provide steady gas temperatures up to 5000R. at 1000 psia pressure. An analysis of the heater performance using an energy balance has yielded an empirical formula, in non-dimensional form, which describes the performance of the heater system over its present range of use. The present unit has application also in the heating of other gases.

AD-611 159 Div. 9, 12
CFSTI Prices: HC$1.00 MF$0.50

Army Missile Command, Redstone Arsenal, Ala.
BASE PRESSURE FOR BODY OF REVOLUTION WITH EXTENDED NOZZLE,
by Troy A. Street. 22 Jul 64, 24p Rept. no. RF-TM-64-23
Proj. 1B2 22901A206

Unclassified report

Descriptors: (*Bodies of revolution, Pressure), (*Programming (Computers), Aerodynamic characteristics), Nozzles, Two-dimensional flow, Programming languages, Aerodynamic loading, Jet mixing flow, Shock waves, Wake, Turbulence, Theory, Guided missiles, Digital computers, Graphics, Iterative methods, Mathematical models.

A program to predict base pressure for a body of revolution with a nozzle extended behind the body was developed in Fortran II for the IBM 1620. The program considers a closed wake, two-dimensional solution. Comparisons of the program results with experimental data and turbulent theory are presented graphically. (Author)

AD-611 167 Div. 9
CFSTI Prices: HC$3.00 MF$0.75

Oceanics, Inc., Plainview, N. Y.
THE INFLUENCE OF FREE AIR BUBBLES ON CAVITY VOLUME AND THE ASSOCIATED NOISE SIGNATURE,
by August F. Lehman. Aug 64, 66p Rept. no. 64-14
Contract NObs88547, Proj. SF013 11 01, Task 1356
Unclassified report

Descriptors: (*Cavitation, Volume), (*Bubbles, Cavitation), (*Cavitation noise, Analysis), Wake, Water tunnels, Acoustic equipment, Cameras, Propellers (Marine), Rotation, Test equipment, Oscilloscopes, Attenuation, Tests, Air, Hydrodynamics.

The series of investigations concerned a study of cavity volume and how the volume was affected by the presence or absence of free air bubbles in the test stream. The cavity was of an intermittent type created when a specially designed propeller passed through a reduced flow region (wake). The size or volume of cavity investigated was such that the largest had a volume greater than 30 times the smallest. In conjunction with the volume studies, measurements were made of the noise characteristics of the cavities employing one third octave analysis. Key conclusions are: (a) free gas bubbles in the water significantly affects the cavity volume, (b) the cavity volume generally appears to be directly associated with the amplitude of the noise signature for a given water condition, (c) bubble-filled water tends to produce smaller signature amplitudes than bubble-free water, (d) the higher frequencies (10 kc and above) are superior to lower frequencies in detecting the existence of cavitation (not including distance considerations). (Author)

AD-611 173 Div. 9
CFSTI Prices: HC$3.00 MF$0.50

General Technology Corp., Elgin, Ill.
A SURVEY OF AERODYNAMIC NOISE.
Rept. for May 63-Jun 64,
by J. D. Ingram. Dec 64, 51p
Contract AF33 657 10945, Proj. 4437, Task 443705
FDL TDR-64-132
Unclassified report

Descriptors: (*Aerodynamic characteristics, Noise), (*Noise, Aerodynamic characteristics), (*Jet engine noise, Reviews), (*Boundary layer, Noise), Gas flow, Turbulence, Theory, Sound.

A representative survey of the literature of aerodynamic noise was made. This was not intended to be an exhaustive list but rather to give the state of the field presently. It was found that much of the research done in this field is either experimental or semi-empirical. This is primarily due to the complex nature of the theory of turbulence. (Author)

AD-611 189 Div. 9
CFSTI Prices: HC$6.00 MF$1.50

Purdue Research Foundation, Lafayette, Ind.
A STUDY OF INCOMPRESSIBLE, BOUNDED TURBULENT JETS,
by John F. Foss and J. B. Jones. Nov 64, 273p
Contract DA83D AMXDO CSA40A, Proj. 3728
Unclassified report

Descriptors: (*Jets, Turbulence), (*Nozzles, Jets), (*Amplifiers, Jets), Incompressible flow, Boundary layer, Three-dimensional flow, Control systems, Instrumentation, Measurement, Momentum, Vortices, Models (Simulations), Geometry, Tables, Graphics.
The purpose of the investigation was twofold. First, studies were directed toward the establishment and investigation of the three-dimensional effects of a single-bounded jet flow between parallel plates. Second, an investigation was made of the jet interaction problem which is the governing factor in all proportional fluid amplifier devices and is an important factor in the operation of bistable amplifier elements. Tests were conducted on jet deflection, mean flow, and the effects of nozzle geometry and momentum flux ratios.

AD-611 191 Div. 9
CFSTI Prices: HC$1.00 MF$0.50

Polytechnic Inst. of Brooklyn, N. Y.
THERMAL AND CHEMICAL EFFECTS IN WAKES,
by Martin H. Bloom. 1962, 14p
Contract AF49 638 445, Proj. 9781
AFOSR 2419; N63 15475
Unclassified report

Paper prepared for presentation at the AGARD Meeting on 'High Temperature Aspects of Hypersonic Flow,' Brussels, Belgium, 3-6 Apr 62.

Descriptors: (*Wake, Hypersonic flow), (*Thermochemistry, Wake), (*Thermal properties, Wake), High temperature research, Fluid mechanics, Boundary layer, Boundary value problems, Three dimensional flow, Shock waves, Diffusion, Gases, Pressure.

The far-wake, the regions in which diffusive phenomena become important and boundary-layer phenomena can be approximated, is discussed quantitatively. The thermal and chemical effects bearing on observable phenomena are discussed, along with the fluid mechanical factors that these effects depend upon. Topics include: scaling, similitude, and orders of magnitude; temperature distributions and electron densities in far-wakes calculated with coupled diffusion and detailed rate chemistry of multicomponent air; effects of differing values of the Lewis and Prandtl number; three-dimensional effects; streamwise pressure gradient effects; and unsteady effects.

AD-611 204 Div. 9, 25
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
EXPANSION OF A FINITE MASS OF GAS INTO VACUUM,
by C. Greifinger and J. D. Cole. Feb 65, 6p
Rept. no. P-3067
Unclassified report

Descriptors: (*Gas flow, Vacuum), (*Vacuum, Gas flow), Shock waves, Supersonic flow, Transport properties.

A summary is presented of research on the problem of the expansion into vacuum of a finite mass of gas initially at rest and in a uniform state, assuming a perfect and inviscid gas. The cases of plane, cylindrical, and spherical flow are considered.

AD-611 272 Div. 9
CFSTI Prices: HC$4.00 MF$1.00

Grumman Aircraft Engineering Corp., Bethpage, N. Y.
AN INVESTIGATION OF HYPERSONIC FLOW SEPARATION AND CONTROL CHARACTERISTICS,
by Louis G. Kaufman, II., Lawrence Meckler, Stavros A. Hartofilis, and Daniel Weiss. Jan 65, 125p
Contract AF33 616 8130, Proj. 8219, Task 821902
FDL TR-64-174
Unclassified report

Descriptors: (*Reentry vehicles, Hypersonic characteristics), (*Hypersonic flow, Control), (*Aerodynamic control surfaces, Effectiveness), (*Aerodynamic configurations, Hypersonic flow), Delta wings, Trailing control surfaces, Aerodynamic heating, Aerodynamic loading, Boundary layer, Wing-body configurations, Hypersonic flight, Test facilities, Experimental data.

Hypersonic flow separation and its effects on control characteristics were investigated analytically and experimentally. Included are conclusions drawn from extensive test data for hypersonic flows over 'basic' geometries and over 'typical' flight configurations with aerodynamic controls. The basic flow geometries discussed include: separation on flat plates ahead of ramps (flaps); flows over sharp expansion corners; 'breakaway' separation; and fin plate interactions. Force data and limited pressure and heating rate distributions are presented for the flight configurations for various trailing edge flap settings. As a supplement to this work, available sources of pertinent hypersonic controls data are tabulated. (Author)

AD-611 294 Div. 9, 25

Massachusetts Inst. of Tech., Cambridge.
ON THE EXPANSION OF A GAS INTO VACUUM,
by H. P. Greenspan and D. S. Butler. 24 Nov 61, 19p
Contract AF49 638 708
AFOSR 2971
Unclassified report

Pub. in Journal of Fluid Mechanics (Gt. Brit.) v13 pt1 p101-19 1962 (copies available only to DDC users).

Descriptors: (*Gas flow, Vacuum), (*Vacuum, Gas flow), Shock waves, Transport properties, Boundary value problems, Pressure, Density, Continuum mechanics.

A study is made of the flow into vacuum of a gas initially at rest in a state of uniform pressure and density; the analysis is based on a continuum model. Among the topics discussed are the motion of the gas-vacuum interface, the reflexion of a plane front off a rigid wall, the propagation of compressive waves within such expansions, the escape from a sphere and the collapse of a spherical cavity.

AD-611 345 Div. 9, 15

Stanford Univ., Calif.
TWO-DIMENSIONAL RADIATING GAS FLOW BY A MOMENT METHOD,
by Ping Cheng. 13 May 64, 3p
Contract AF49 638 1280
AFOSR 65-0029
Unclassified report

Pub. in A I A A Journal (U. S.) v2 n9 p1662-64 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Gas flow, Two-dimensional flow), (*Electromagnetic waves, Gas flow), Transport properties, Harmonic analysis, Partial differential equations, Equations of state, Integral equations.

AD-611 347 Div. 9

Stanford Univ., Calif.
STAGNATION EQUILIBRIUM LAYER IN NONEQUILIBRIUM BLUNT-BODY FLOWS,
by Raul J. Conti. 1 Jul 64, 3p
Contract AF49 638 1280
AFOSR 65-0277
Unclassified report

Pub. in A I A A Journal (U. S.) v2 n11 p2044-46 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Stagnation point, Laminar flow), (*Hypersonic flow, Blunt bodies), (*Blunt bodies, Stagnation point), Frozen equilibrium flow, Gas flow, Series, Nonequilibrium flow.

AD-611 354 Div. 9

Cornell Aeronautical Lab., Inc., Buffalo, N. Y.
ON 'NUMERICAL COMPARISON BETWEEN EXACT AND APPROXIMATE THEORIES OF HYPERSONIC INVISCID FLOW PAST SLENDER BLUNT-NOSED BODIES',
by H. K. Cheng and A. L. Chang. 20 Apr 61, 3p
Contract AF49 638 952
AFOSR 604
Unclassified report

Pub. in A R S Journal (U. S.) v31 no7 p1024-26 Jul 61 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Hypersonic flow, Numerical analysis), (*Reentry vehicles, Hypersonic flow), Slender bodies, Blunt bodies, Cylindrical bodies, Aerodynamic characteristics, Blast, Drag, Energy, Theory, Reviews.

Feldman (ARS Journal 30:5, p. 463) presented numerical results, based on the method of characteristics for an inviscid hypersonic flow in local thermal equilibrium about a long hemisphere cylinder. The purpose of this note is to point out that the increase of cross flow energy when correctly calculated from the flow quantities provided by the characteristics methods does remain essentially constant and does agree within the expected degree of accuracy with that required by blast wave theory.

AD-611 456 Div. 9, 25

Brown Univ., Providence, R. I.
SECULAR BEHAVIOR IN AN ANALYSIS OF DAMPED STANDING WAVES IN A GAS,
by T. F. Morse. 15 Jun 64, 6p
Contract AF49 638 1326
AFOSR 65-0278
Unclassified report

Pub. in Physics of Fluids (U. S.) v7 n10 p1691-95 Oct 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Fluid mechanics, Statistical mechanics), (*Statistical mechanics, Fluid mechanics), Differential geometry, Hydrodynamics, Perturbation theory, Boundary value problems, Gases, Damping.

By considering multiple time scale behavior in the viscous damping of a one-dimensional wave, it has been shown how secularities (terms growing unbounded in time) present in the Hilbert solution of this problem may be eliminated. The method of time scales and the accompanying freedom to remove secular terms overcomes in part the major disadvantage of the Hilbert procedure which requires a periodic renormalization of the lowest order initial conditions. This method, which has proved most useful in nonequilibrium statistical mechanics, provides a link between the Hilbert and Chapman-Enskog treatment of a simple hydrodynamic problem. (Author)

10. Fuels and Combustion

AD-610 853 Div. 10, 4
CFSTI Prices: HC$2.00 MF$0.50

Du Pont de Nemours (E.I.) and Co., Inc., Wilmington, Del. Electrochemicals Dept.
STABILITY OF HIGH STRENGTH H202.
Quarterly rept. for period ending 31 Dec 64.
31 Dec 64, 29p
Contract AF04 611 10216, ARPA Order no. 24
Unclassified report

Descriptors: (*Oxidizers, Stability), (*Hydrogen peroxide, Stability), (*Halocarbon plastics, Compatibility), (*Polyethylene plastics, Compatibility), Storage, Decomposition, Films, Degradation, Purification, Aluminum, Nuclear magnetic resonance, Reaction kinetics.

Commercial 90 and 98% hydrogen peroxide, maintained at -60C in the solid state, decomposes at a rate of less than 1 ppm per day. As this is the order of magnitude of detection of decomposition in the equipment used it is believed that under these conditions high strength hydrogen peroxide can be considered stable and storable (less than 0.1% decomposition in 3 years). 'Teflon' TFE fluorocarbon film was inert to 90% hydrogen peroxide for 900 hours at 70C. There was no evidence of chemical attack on the film, nor any change in its physical properties. The mechanism of chemical attack of 90% hydrogen peroxide on polyethylene films between 50 and 70C. was identified, and found to vary, depending upon the structure of the polyethylene. Direct experimental techniques for observation of the decomposition products of hydrogen peroxide (.OH and HO2.) were developed. (Author)

AD-610 970 Div. 10
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
SOLID GASOLINE,
by B. I. Losev. May 58, 6p T-289-R
TT 60-22008
Unclassified report

Trans. of Akademiya Nauk SSSR. Vestnik, 1958, v. 28, no. 1, p. 65-68.
Also available from NRC as C-2695.

Descriptors: (*Gasoline, Packaging), (*Petroleum, Colloids), Hydrocarbons, Solids, Stabilization, Films, Albumens, Plastics, Plasticizers, Handling, Storage, Fire safety, USSR.

A method is described for 'packaging' gasoline, and the technological flow-chart for this purpose is presented. The production of briquettes of 'packaged' liquid hydrocarbons involves two processes: the production of a high-concentration emulsion, and subsequent plastification. The emulsion is produced with a gear-type or disc-type emulsifier, in which the agitation of two mutually immiscible liquids of different polarity brings about the formation of emulsions of tupe O-W (oil in water) and W-O (water in oil).

AD-611 071 Div. 10, 4
CFSTI Prices: HC$2.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
CHEMISTRY OF SULPHUR ORGANIC COMPOUNDS CONTAINED IN PETROLEUM AND PETROLEUM PRODUCTS, 1963, VOL. 5: SELECTED ARTICLES.
12 Jan 65, 45p FTD-MT-64-215
TT 65-61685
Unclassified report

Edited machine trans. of Khimiya Seraorganicheskikh Soedinenii, Soderzhashchiksya v Neftyakh i Nefteproduktakh (USSR) 1963, v. 5, p. 149-182.

Descriptors: (*Petroleum, Organic sulfur compounds), (*Organic sulfur compounds, Petroleum), (*Fuels, Impurities), Corrosion, Tar, Separation, Organic nitrogen compounds, Oxidation, Distillation, Pyrolysis, Stability, Purification, USSR.

Contents:
Influence of Organic Sulfur Compounds on Exploitational Properties of Fuel TS-1, by Ya. B. Chertkov, V. M. Shchagin and V. N. Zrelov
Influence of Natural and Synthetic Sulphur and Nitrogen Containing Compounds on the Thermooxidizing Stability of Direct Distillation of Fuels, by G. F. Bol'shakov, P. I. Davydov, T. G. Potapenko, F. Yu. Rachinskiy and N. M. Slavachevakaya
Investigation of the Thermal Stability and Corrosiveness of Sulfurous Fuels at Temperatures Above 100 C, by Ye. R. Tereshchenko and M. Ye. Tararyshkin.

AD-611 111 Div. 10, 4, 9
CFSTI Prices: HC$1.00 MF$0.50

IIT Research Inst., Chicago, Ill.
ANALYTICAL INVESTIGATION OF COMBUSTION INSTABILITY IN SOLID PROPELLANT ROCKETS.
Quarterly progress rept. no. 6.
10 Jan 63, 9p
Contract AF49 638 1094, Proj. A6002
Unclassified report

Descriptors: (*Solid rocket propellants, Combustion), (*Combustion, Fluid dynamic properties), Programming (Computers), Mathematical models, Laminar flow, Two-dimensional flow, Boundary layer, Nitrocellulose, Nitroglycerin, Reaction kinetics, Flames, Combustion products, Stability.

Progress is reported on studies concerning the use of a fluid dynamic model for the combustion zone of a solid propellant rocket undergoing erosive burning. Work involved the debugging of a computer program, an evaluation of the numerical stability of the equations of a program for two-dimensional steady-state boundary layer analysis, and a study of the gas-phase kinetics of nitrocellulose-nitroglycerin combustion.

AD-611 112 Div. 10, 4, 9
CFSTI Prices: HC$1.00 MF$0.50

IIT Research Inst., Chicago, Ill.
ANALYTICAL INVESTIGATION OF COMBUSTION INSTABILITY IN SOLID PROPELLANT ROCKETS.
Quarterly progress rept. no. 7.
1 Apr 63, 7p
Contract AF49 638 1094, Proj. A6002
Unclassified report

See also AD-611 111.

Descriptors: (*Solid rocket propellants, Combustion), (*Combustion, Fluid dynamic properties), Programming (Computers), Mathematical models, Laminar flow, Differential equations, Nitrocellulose, Nitroglycerin, Reaction kinetics, Flames, Combustion products, Stability.

Progress is reported on studies concerning the use of a fluid dynamic model for the combustion zone of a solid propellant rocket undergoing erosive burning. Work involved the debugging of a computer program, trial calculations using the program, and a study of the gas-phase reaction kinetics involved in nitrocellulose-nitroglycerin combustion.

AD-611 357 Div. 10, 4

Hull Univ. (England).
ROLE OF HYDROGEN PEROXIDE. 2. THE DISSOCIATION OF HYDROGEN PEROXIDE AND ITS ROLE IN THE HYDROGEN-OXYGEN REACTION,
by R. R. Baldwin, P. Doran, and L. Mayor.
1962, 8p
Contract AF61 052 62
AFOSR 2493

Unclassified report

Pub. in mono. International Symposium on Combustion (8th) Baltimore, 1962. Proceedings. p103-9. (Copies not available to DDC or Clearinghouse customers.)

Descriptors: (*Combustion products, Hydrogen peroxide), (*Hydrogen peroxide, Dissociation), Hydrogen, Oxygen, Reaction kinetics, Test methods, Boric acids, Coatings, Thermochemistry, Chemical equilibrium, Great Britain.

AD-611 393 Div. 10, 14
CFSTI Prices: HC$1.00 MF$0.50

Keck (W. M.) Lab. of Engineering Materials, Calif Inst. of Tech., Pasadena.
A RESEARCH PROGRAM ON SOLID PROPELLANT PHYSICAL BEHAVIOR.
Quarterly rept. no. 4, 1 Aug-30 Nov 64,
by M. L. Williams. Dec 64, 8p MATSCIT-PS-64-10
Contract AF04 611 9572

Unclassified report

See also AD-605 202.

Descriptors: (*Solid rocket propellants, Physical properties), (*Vulcanizates, Mechanical properties), Elastomers, Isocyanate plastics, Rocket motors (Solid propellant), Failure (Mechanics), Fracture (Mechanics), Strain (Mechanics), Stresses, Standards, Selection, Deformation, Elasticity, Aging (Materials), Models (Simulations), Rubber.

Research progress in the following fields is summarized: behavior of polymeric and composite systems (mechanical behavior of gum rubber vulcanizates); standardized material characterization; data information facility.

11. Ground Transportation Equipment

AD-611 318 Div. 11, 13, 22
CFSTI Prices: HC$3.00 MF$0.75

Federal Civil Defense Administration, Washington, D. C.
EXPOSURE OF MOBILE HOMES AND EMERGENCY VEHICLES TO NUCLEAR EXPLOSIONS,
by Ebe R. Shaw and Frank P. McNea. Jul 57, 53p
Projs. 36 1, 36 2
WT 1181

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.

Descriptors: (*Nuclear explosion damage, Vehicles), (*Vehicles, Nuclear explosion damage), (*Housing, Nuclear explosion damage), Mobile, Trailers, Vulnerability, Explosion effects, Photographs.

Experiments were conducted to determine the effects of a nuclear explosion on mobile homes at pressure levels which might be expected in the suburbs of a large city and to determine the effects on emergency vehicles and their equipment located at various simulated distances from near Ground Zero to the suburbs of a large city. Missiles produced by flying glass and the translocation of furniture in the mobile homes are potential hazards to personnel occupying these homes at the time of the blast. Screening or other means of protecting the interior against glass splinters reduces this hazard. By rearrangement of the displaced furniture, clearing up debris, and improvising window coverings, trailers in this area of damage could readily be made habitable. Emergency vehicles caught in the open near Ground Zero would be completely destroyed. Vehicles in medium- and low-pressure regions would suffer damage, but the vehicles and equipment would probably be operable. (Author)

12. Guided Missiles

AD-610 855 Div. 12, 30
CFSTI Prices: HC$7.00 MF$1.75

Air Force Missile Test Center, Patrick AFB, Fla.
JOINT AFMTC/RANGE USER DATA CONFERENCE (3rd).
A compilation of papers presented.
Mar 62, 333p AFETR-TR-65-3 Unclassified report

Data Conference held at Orlando Air Force Base, Fla., 6-8 Mar 62.

Descriptors: (*Air Force, Guided missile ranges), (*Guided missile tracking systems, Symposia), (*Data processing systems, Guided missile tracking systems), Ballistic cameras, Geodesics, Radar tracking, Atmospheric refraction, Real time, Computers, Guided missile trajectories, Impact prediction, Atlantic Ocean.

The scope of the 1962 Data Conference was planned to meet the interest of the attendees in the entire program with the central theme of the problems of improving range data and Air Force Missile Test Center's approach to their solution. This compilation of the papers presented may be used for reference as to the data reduction and instrumentation analysis methods in use at the Atlantic Missile Range. Operational performance over the past years and goals for the forthcoming year in the areas of data reduction and instrumentation analysis are presented, with a summary of the range development programs in the areas of new instrumentation and data processing equipment. (Author)

AD-610 964 Div. 12, 15
CFSTI Prices: HC$2.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ORBITAL PERTURBATIONS OF ARTIFICIAL SATELLITES,
by D. E. Okhotsimskii, T. M. Eneev, G. P. Taratynova, and I. M. Yatsunskii. Dec 57, 46p T-270-R
TT 65-61662 Unclassified report

Trans. of Uspekhi Fizicheskikh Nauk (USSR) 1957, v. 63, no. 1, p. 33-71.

Descriptors: (*Satellites (Artificial), Life expectancy), (*Elliptical orbit trajectories, Satellites (Artificial)), (*Motion, Satellites (Artificial)), Mathematical prediction, Perturbation theory, Orbital trajectories, Differential equations, Tables, Terrestrial magnetism, Drag, Bessel functions, Anomalies, USSR.

Contents:
Determination of the lifetime of an artificial earth-satellite and study of the secular perturbations of its orbit
Satellite in the non-central field of terrestrial gravitation in the presence of atmospheric resistance
Effect of geophysical factors on the motion of a satellite.

AD-610 967 Div. 12, 2
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
LAWS OF MOTION OF AN EARTH-SATELLITE,
by Yu. A. Pobedonostsev. Mar 58, 14p T-283-R
TT 65-61665 Unclassified report

Trans. of Priroda (USSR) 1958, v. 47, no. 1, p. 19-25.

Descriptors: (*Celestial mechanics, Satellites (Artificial)), (*Satellites (Artificial), Motion), (*Launching, Mathematical analysis), Launch vehicles (Aerospace), Staging, Payload, Orbital trajectories, Space environmental conditions, Energy, Rocket propellants, Earth, Equations, USSR.

An attempt is made to give a general idea of the fundamental relationships and laws governing the launching of a satellite by a multi-stage rocket and its motion around the globe.

AD-610 978 Div. 12
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
A GREAT VICTORY OF SOVIET SCIENCE,
by A. N. Nesmeyanov. Jan 59, 7p T-312-R
TT 59-15265 Unclassified report

Trans. of Akademiya Nauk SSSR. Vestnik, 1958, v. 28, no. 11, p. 3-9.

Descriptors: (*Satellites (Artificial), USSR), Astronautics, Scientific research, Satellite networks, Communication satellites (Active), Meteorological satellites.

A report is presented of an address by Nesmeyanov, President of the Academy of Sciences of the USSR, delivered in the Hall of Columns of the House of the Soviets on the 3rd of October, at a meeting of scientists and representatives of the Moscow community to mark the anniversary of the first artificial earth-satellite. The translation omits a formal introduction in which the speaker compares the launching of the first sputnik to great scientific turning-points in human history, such as Mendeleyev's discovery of the periodic table, the conquest of the air, and the invention of wireless telegraphy. Some results are noted of the researches carried out by means of three Soviet artificial earth satellites.

AD-611 017 Div. 12
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE MECHANIZED HAND.
2 Feb 65, 4p FTD-TT-64-900
TT 65-61676 Unclassified report

Unedited rough draft trans. of Znanie-Sila (USSR) 1963, v. 38, no. 12, p. 16.

Descriptors: (*Manned spacecraft, Control), Astronauts, Acceleration, Artificial limbs, Hands, USSR.

At the time of cosmic flight, the cosmonaut is exposed to much greater over-loads. In such conditions, it is difficult to control the cosmic ship with the aid of manual control, because it is necessary to overcome the additional weight of the hands, created on account of the overload. One of the American companies carried out successful experiments (repeating the experiments of Soviet

scientists) to control by a 'mechanical' hand with the aid of bio-currents. On the cosmonaut's hand is fitted a special 'glove' which is brought into movement by an electrical or hydraulic drive. In this way, the movement of the hand is executed on account of muscle forces, and on account of drive operation. The device enables free movement of the hand at forces of the order of 40 kilos. (Document quoted in its entirety)

AD-611 042 Div. 12, 2
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
MOTION OF CLOSE ARTIFICIAL SATELLITES,
by Y. Kozai. 12 Jan 65, 19p FTD-MT-64-349
TT 65-61710
Unclassified report

Edited machine trans. of mono. Konferentsiya po Obshchim i Prikladnym Voprosam Teoreticheskoi Astronomii (Conference on General and Applied Problems of Theoretical Astronomy) Moscow, 1961. Doklady, Moscow, 1963, p. 107-118.
Another trans. is available from CFSTI HC$7.00, MF$1.50 in AD-608 295, FTD-MT-64-226, 7 Aug 64, 326p.

Descriptors: (*Satellites (Artificial), Motion), (*Perturbation theory, Motion), Dynamics, Geophysics, Solar radiation, Moon, Gravity, Celestial mechanics, Harmonic analysis, Numerical analysis, Differential equations, Integration, USSR, Astronautics.

In this study, consideration is given to periodic and secular perturbations, lunar - solar perturbations, and perturbations caused by flattening of the earth as they affect the motion of artificial satellites.

AD-611 109 Div. 12
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PARADOXES OF COSMONAUTICS,
by Yu. Pobedonostsev. 1964, 7p FTD-ST-63-5
TT 65-61739
Unclassified report

Trans. of Aviatsiya i Kosmonavtika (USSR) 1963, v. 45, no. 4, p. 26-32.

Descriptors: (*Space flight, Orbital trajectories), (*Orbital trajectories, Space flight), Rockets, Satellites (Artificial), Spacecraft, Rocket propellants, Velocity, Elliptical orbit trajectories, Circular orbit trajectories, Celestial mechanics, USSR.

The problem involved in selecting the route for an interplanetary flight is examined. Mathematical verification is offered to support the paradoxical conclusion that the shortest route toward a selected target is not always the most advantageous.

AD-611 110 Div. 12
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
WHAT SCIENCE LEARNED ABOUT THE UNIVERSE FROM THE FIRST FLIGHT,
by V. Dobronravov. 1962, 10p FTD-ST-62-4
TT 65-61740 Unclassified report

Trans. of Aviatsiya i Kosmonavtika (USSR) 1962, v. 44, no. 4, p. 20-27.

Descriptors: (*Space flight, USSR), Manned spacecraft, Astronauts, Orbital trajectories, Flight control systems, Atmosphere entry, Space environmental conditions, Weightlessness, Meteorological satellites, Public opinion.

The first Soviet manned space flight is discussed in terms of its contribution toward progress in science and technology. Problems involving space flight, weightlessness, and re-entry are also described. A brief note concerning the Soviet meteorological satellite program is included.

AD-611 140 Div. 12, 15, 19, 30
CFSTI Prices: HC$6.00 MF$1.50

Aeronutronic, Newport Beach, Calif.
INITIAL ORBIT MODULE PROGRAM DOCUMENT,
by C. Purcell and A. F. Hall. Dec 64, 243p
Rept. pub. no. U-2998
Contract AF19 628 3393
ESD TDR65 78
Unclassified report

See also AD-286 346, AD-415 047, AD-429 468.

Descriptors: (*Orbital trajectories, Programming (Computers)), (*Satellites (Artificial), Orbital trajectories), (*Programming (Computers), Orbital trajectories), Guided missile tracking systems, Data processing systems, Celestial mechanics, Elliptical orbit trajectories, Least squares method, Programming languages, Iterative methods.

A computer program which determines initial orbit elements from various types of observations is described in this report. Manual control over each stage of the computations may be exercised through program options. Completely automatic processing of observations to final orbit elements may also be obtained. The document includes mathematical formulations, operating instructions, test cases, program flow diagrams and listing. (Author)

AD-611 156 Div. 12, 22
CFSTI Prices: HC$6.00 MF$1.25

Magnavox CO., Urbana, Ill.
MINIATURE SOLID STATE ARM SAFE DEVICE, PHASE IV.
Final summary rept. for 21 Apr-15 Oct 64,
by L. Ricketts. 30 Oct 64, 205p
Contract DA11 0220RD4048A
Unclassified report

See also AD-416 631.

Descriptors: (*Arming devices, Miniature electronic equipment), (*Guided missile warheads, Arming devices), (*Transducers, Arming devices), Destructors, Pressure switches, Paints, Hysteresis, Integrated circuits, Amplifiers, Trigger circuits, Thermistors, Accelerometers, Environmental tests, Test equipment, Manufacturing methods, Packaging.

The report covers pertinent facts, figures, and data pertaining to the research and development effort expended on Phase IV of the Miniature Solid State Arm Safe Device. Investigations were primarily concerned with improving the pillbox transducer, improving some of the characteristics of the Miniature Solid State Arm

Safe Device itself, and extending the previous Device to that of a predetermined application. Specific accomplishments are as follows: the properties of the transducers were considerably improved; the arming time was extended to 150 seconds; the transducer was isolated from the transistorized integrating circuits; the bias balancing of the circuits are such that the Device can remain unshorted for at least 5 minutes before the fire command without adverse effects; the presetters were calibrated and manually controlled to within plus or minus 3 percent accuracy; all presetters were approximately 1 cubic inch in volume; the size of the two Miniature Devices was 2 inches in diameter and 2 inches in height and 0.2 cubic inch for the subminiature model; the current drain from the 6 volt supply was less than 250 milliamperes in all Devices; all environmental specifications were met.

AD-611 171 Div. 12, 14, 26
CFSTI Prices: HC$4.00 MF$1.00

Mechanical Technology, Inc., Latham, N. Y.
INVESTIGATION OF COMPLEX BEARING AND/OR LUBRICATION SYSTEMS FOR HIGH SPEED, HIGH TEMPERATURE OPERATION.
Rept. for Apr 62-Dec 63,
by P. Lewis, S. F. Murray and M. B. Peterson.
Jan 64, 140p
Contract AF33 657 8666, Proj. 8128, Task 812801
FDL TDR-64-12

Unclassified report

Descriptors: (*Roller bearings, Spacecraft), (*Lubrication, Spacecraft), (*Spacecraft, Roller bearings), Lubricants, Gas bearings, Antifriction bearings, Films, Solids, Gases, Powders, Aluminum compounds, Oxides, Titanium compounds, Carbides, Lead compounds, Molybdates, Molybdenum compounds, Sulfides.

The report describes a program whose objective was to utilize complex or combined systems in order to permit operation over a wide temperature range at high speed and a variety of ambient pressures. The program reviewed the various individual items which constitute an overall system. Because of the restriction in size, desirability of light weight, and requirement for a self contained system, the rolling element bearing system was selected. The low temperature bearing for use to 1000 F would consist of Stellite 3 races and Star J balls while the high temperature bearing for operation from 1000 F to 1500 F would be either A1203 balls and races or titanium carbide balls and races. With a two bearing system, means must be found to actuate and switch from one bearing to the other. Positive actuation was selected which would remove the inactive bearing from the system. An alternate land and groove arrangement permitted engagement and disengagement with short axial movements. Solid lubricants were selected as most promising for lubrication. Because the high temperature bearing is either a ceramic or a carbide, a solution to the normal surface deterioration was sought.

AD-611 283 Div. 12, 2, 6
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
SPECIAL PERTURBATION TECHNIQUES APPLICABLE TO SPACETRACK,
by P. Chambliss, Jr. and J. Stanfield. Jul 64,
23p Technical memo. no. TM-LX-145/000/00
Contract AF19 628 1648, Proj. 496L
ESD TDR-64-533

Unclassified report

Descriptors: (*Satellites (Artificial), Motion), (*Perturbation theory, Orbital trajectories), (*Space surveillance systems, Perturbation theory), Tracking, Dyanmics, Celestial mechanics, Acceleration, Numerical analysis.

This report describes in detail three special techniques which can be specifically applied in the SPACETRACK system to determine the motion of an artificial satellite under the influence of perturbing accelerations. These are Variation of Parameters, Cowell's Method, and Encke's Method. (Author)

AD-611 406 Div. 12, 9
CFSTI Prices: HC$3.00 MF$0.75

Naval Ordnance Lab., White Oak, Md.
A STUDY OF THE WATER-ENTRY CAVITY,
by Albert May and William R. Hoover. 4 Dec 63,
75p NOLTR-63-264, BRL-121
Task RRRE04 022 002

Unclassified report

Descriptors: (*Cavitation, Water entry), (*Guided missiles, Water entry), (*Water entry, Cavitation), Correlation techniques, Pressure, Configuration, Geometry, Volume, Experimental data, Graphics, Theory, Spheres.

For missiles producing clean cavities after water entry the cavity development is shown by theory to depend significantly only on: entry angle, an effective mass, and a Froude number based on the nose-flat diameter. A method is outlined for estimating pressures in closed, almost-steady cavities, from cavity geometry. Data from application of these methods to water-entry records of models are given. Influence of effective mass was small. The pressures in steady cavities were estimated as 0.5 to 1.3 atmospheres. (Author)

13. Installations and Construction

AD-611 138 Div. 13, 14
CFSTI Prices: HC$1.00 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
STUDY OF CREEP IN CONCRETE - PHASE 2 (HOLLOW-BOX BEAM).
by John R. Keeton. 4 Feb 65, 34p
Technical rept. no. R-333-11
Proj. Y R007 05 01 011

Unclassified report

Descriptors: (*Concrete, Box beams), (*Box beams, Concrete), (*Creep, Concrete), Civil engineering, Reinforcing materials, Structures, Loading (Mechanics), Strain (Mechanics), Deformation, Measurement.

Cylindrical concrete specimens 3 inches in diameter by 9 inches long and 6 inches in diameter by 18 inches long were tested in controlled storage environments of 20% RH, 50% RH, 75% RH, and 100% RH, with the temperature at 73 F in all cases. Creep specimens were subjected to constant sustained compressive loads causing stresses up to about 50% of the ultimate compressive strength of the concrete. Nonloaded companion specimens were included to determine shrinkage. Time-dependent strain measured on a loaded specimen (total creep) is shown to be the result of viscous flow (viscous creep) and of seepage of gel water (seepage creep). Total creep data from the cylinders were extrapolated to estimate the total creep of beams by plotting these data versus the ratio of the exposed surface area to volume. Errors in the estimates were determined from previous data obtained in hollow-box beam tests. For the top of the hollow-box beams, they were as follows: +8.8% near the center and +9.5% near one end (175 days after loading); +0.6% near the center and +4.8% near one end (897 days after loading); -1.8% near the center and +3.2% near one end (using maximum strain attained in the beams). (Author)

AD-611 160 Div. 13, 18
CFSTI Prices: HC$2.00 MF$0.75

Federal Civil Defense Administration, Washington, D. C.
DAMAGE TO CONVENTIONAL AND SPECIAL TYPES OF RESIDENCES EXPOSED TO NUCLEAR EFFECTS.
Rept. for Feb-May 55,
by Philip A. Randall. 12 Apr 61, 81p
Proj. 31 1
WT 1194

Unclassified report

Rept. on OPERATION TEAPOT.
Research done in cooperation with the Federal Housing Administration, Washington, D. C., and the Housing and Home Finance Agency, Washington, D. C.

Descriptors: (*Housing, Nuclear explosion damage), (*Nuclear explosion damage, Housing), (*Civil defense systems, Housing), Buildings, Wood, Brick, Reinforced concrete, Structural properties, Vulnerability, Nuclear explosions, Civil engineering, Photographs.

At the Nevada Test Site of the Atomic Energy Commission, 10 residential structures were exposed to the explosion of a nuclear device (Apple II) of approximately 30-kt yield, detonated atop a 500-ft tower, to test their behavior and resistance to nuclear weapons effects and to obtain data that will contribute to the development of improved protective designs. From a determination of the behavior of these structures under blast, thermal, and nuclear radiation effects, it should be possible to determine the best steps to be taken for the protection of families living in such structures and to obtain necessary additional data on the strengths of the structures as a whole and possible weaknesses in component parts. The project was concerned primarily with blast and radiation effects on residential structures, and precautions were taken to avoid ignition of the structures by the thermal energy of the explosion. Data obtained are expected to be useful also in the development of methods for strengthening the structures within limits of practical economy, and in providing information on the possible use of the structures for housing without major repairs following a nuclear event.

AD-611 225 Div. 13, 20, 25
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.
SHOCK DIFFRACTION IN THE VICINITY OF A STRUCTURE,
by W. E. Morris. Aug 59, 37p
Proj. 3 lu
WT 786

Unclassified report

Rept. on Operation Upshot-Knothole, Nevada Proving Grounds, Mar-Jun 53.

Descriptors: (*Shock waves, Nuclear explosions), (*Structures, Shock waves), Shock (Mechanics), Loading (Mechanics), Pressure gages, Time, Measurement.

A study of the shock-diffraction pattern in the vicinity of a structure was conducted to determine the loading of a structure in the vicinity of another structure and to determine at what distance the diffracted shock recovered to its free-field condition. Fourteen Wiancko inductance-type pressure-time gages were mounted at ground level, and 5 feet above the ground, in an array to the rear and side of the 3.1t structure. This structure was 12 feet long, 6 feet wide and 6 feet high, and was located 2,200 feet from ground zero. It was oriented with its long side nearly, but not quite, parallel with the shock front. Pressure applied to the gage varied its inductance which, in turn, varied the frequency of a Hartley oscillator, of which the gage formed the inductive element. The frequency-modulated signal was transmitted by wire, and recorded on magnetic-tape recorders. In playback, the frequency-modulated signals were converted to amplitude-modulated signals and presented as pressure-time traces. Even though the shock loading on the 3.1t structure was different for Shots 9 and 10, the diffraction effects disappeared at about the same distance from the structure on both shots. Diffraction effects to both the side and rear were visible, but almost gone, at 4S, where S is a characteristic dimension of the structure (front-face height or half width, whichever is less); the effects had disappeared at 8S, and it is estimated that the blast wave again was identical with the freefield condition at 6S.

AD-611 232 Div. 13, 20, 22
CFSTI Prices: HC$5.00 MF$1.00

Holmes and Narver, Inc., Los Angeles, Calif.
EVALUATION OF NUCLEAR BLAST EFFECTS ON AEC TEST-SITE FACILITIES (PARTS I, II, AND III),
by R. A. Cameron, Jr., R. A. Williamson, and R. H. F. Boothe. Jun 59, 155p
Proj. 34 3a
WT 1455

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Nuclear explosion damage, Structures), (*Structures, Nuclear explosion damage), Towers,

Loading (Mechanics), Underground structures, Pressure, Blast, Concrete.

The objective of the studies was to obtain information of value for the design of blast-resistant structures. The project was divided into the three parts. Part I measurements of retaining-wall displacements. The purpose was to obtain information that would verify design assumptions regarding the direction of the net horizontal force acting on stems of retaining walls subjected to blast from air bursts directly above. Data were obtained on the permanent displacements of retaining walls and adjacent soil produced by nuclear blast loading. Results indicated that the effective transient thrust was outward. Part II measurements of tower displacements. A need exists for better information on the resistance of guyed towers to blast so that tower spacing can be established in planning test operations. Observed response was in fair agreement with predicted response. A recommendation is presented of yield-distance relations for limiting blast load on a typical 500-ft guyed tower. Part III measurements on miscellaneous structures. In addition to the two planned experiments of Parts I and II, studies were made of two structures that were used by other projects, an underground rigid structure and bell covers.

AD-611 234 Div. 13, 20, 22
CFSTI Prices: HC$2.00 MF$0.50

Holmes and Narver, Inc., Los Angeles, Calif.
TEST OF BURIED STRUCTURAL-PLATE PIPES SUBJECTED TO BLAST LOADING,
by R. A. Williamson and P. H. Huff. Aug 60, 45p
Proj. 34 3
WT 1474

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Nuclear explosion damage, Underground structures), (*Underground structures, Pipes), (*Pipes, Underground structures), Explosion effects, Concrete, Test methods, Engineering geology, Civil engineering, Nevada.

Two 20-ft-long 7-ft-diameter 10-gauge structural-plate pipes, having longitudinal joints with eight bolts per foot, were buried and tested at predicted pressure levels of 195 and 265 psi (actual pressure levels of approximately 190 and 245 psi). The depth of burial was 10 ft over the crown of the pipe. The principal measurements taken of each pipe were the transient changes in horizontal and vertical diameters vs. time, vertical and horizontal accelerations of the pipe invert, and the maximum interior overpressure. Supplementary data were the preshot and postshot measurements of horizontal and vertical diameters, joint slip, distances between end bulkheads, and elevations of the ground surface. Soil properties obtained included density, percentage of compaction, gradation, and the coefficient of internal friction. Maximum transient changes in vertical and horizontal diameters, which were measured by self-recording gauges, were about 7/8 in. and 3/8 in., respectively. Maximum residual changes in the same diameters were about 3/4 in. and 1/4 in., respectively. Discrepancies were found between measurements of the residual changes recorded by the gauges and measurements obtained visually before and after the event. Slip in the bolted joints was negligible. (Author)

AD-611 243 Div. 13
CFSTI Prices: HC$1.00 MF$0.50

Army Engineer Waterways Experiment Station, Vicksburg, Miss.
GROUTING CONSULTING SERVICE,
by James M. Polatty, Ralph A. Bendinelli, Melvin Glass, and Bill J. Houston. Dec 58, 22p
Proj. 26 12
WT 1713

Unclassified report

Rept. on Operation HARDTACK, Phase II, Apr-Oct 58.

Descriptors: (*Mining engineering, Materials), Mixtures, Drilling machines, Fluids, Cements, Sand, Silicon compounds, Dioxides, Aluminium, Powder metals, Water, Underground structures.

The drilling and grouting operations conducted in connection with the underground nuclear detonations of Operation Hardtack, Phase II, are described in detail. The composition of the four grouting mixtures used is given. Also, hourly time logs are included as tables of the drilling of the four holes. (Author)

AD-611 248 Div. 13, 20
CFSTI Prices: HC$2.00 MF$0.50

Harvard Univ., Boston, Mass. Air Cleaning Lab.
BLAST EFFECTS ON AN AIR-CLEANING SYSTEM,
by Richard Dennis, Charles E. Billings, and Leslie Silverman. Apr 62, 46p
Proj. 34 4
WT 1475

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Gas filters, Blast), (*Blast, Gas filters), (*Nuclear explosion damage, Gas filters), Pressure, Shock waves, Dust, Glass textiles, Wire, Damping, Ventilation ducts, Radiological contamination, Decontamination, Ventilation, Effectiveness.

Objectives of this project were (1) to determine the effects of blasts on filtration devices and typical gas-cleaning systems in the 3- and 1-psi overpressure range, (2) to measure dust dislodged from AEC filters and dry plates by blast and reentrained in reverse-flow air, (3) to determine the pressure attenuation and dust-recovery characteristics of typical wire-mesh viscous filters and dry Fiberglas filters, (4) to determine the natural damping effect of duct work and stacks, and (5) to compare field and laboratory data to determine if present and future laboratory tests can be extrapolated to predict field conditions. Test results showed no damage to AEC filters and only minor damage to Fiberglas filters. Total reentrainment ranged from 73 per cent of total AEC filter loading (4.0-psig area) to 53 per cent (1.9-psig area). Dry plates lost 95 per cent of their original dust holding. Prefilters recovered approximately 30 per cent of the dust dislodged from AEC filters. Wire-mesh afterfilters reduced dust loss from 53 to 4.5 per cent. Field tests appear to agree with laboratory studies and indicate that future tests can be performed successfully in laboratory shock tubes. (Author)

AD-611 251 Div. 13, 20, 22
CFSTI Prices: HC$3.00 MF$0.75

Federal Civil Defense Administration, Washington, D. C.
EFFECTS OF AN ATOMIC EXPLOSION ON TWO TYPICAL TWO-STORY-AND-BASEMENT-WOOD-FRAME HOUSES,
by Joseph B. Byrnes. Sep 53, 63p

Proj. 21 2 Unclassified report
WT 792
Rept. on Operation Upshot-Knothole, Nevada Proving Grounds, Mar-Jun 53.

Descriptors: (*Nuclear explosion damage, Buildings), Buildings, Gamma rays, Thermal radiation, Visual inspection, Photography, Blast, Radiation damage.

Two typical two-story frame houses, without utilities, were located at 7500 and 3500 ft from Ground Zero of a 16.4-kt bomb exploded at 300 ft above the ground. Exposure of the houses was for public demonstration purposes and to study the gamma-radiation scatter and the effects of thermal radiation and blast on each house. Both houses were furnished, and, in each, department-store mannequins were placed in the dining and living rooms. Film badges to measure gamma radiation were placed in layers throughout the house at 7500 ft and in the basement of the house at 3500 ft. Visual inspection and photography were utilized to study thermal-radiation and blast effects. Conclusions: A conventional wood-frame house will be severely damaged at an overpressure of 2 psi and will be destroyed at 5 psi. Damage to mannequins indicates that human beings without shelter in the same locations would have been injured in the far-range house and either killed or seriously injured in the near house by the effects of blast. Conventional methods of wood-frame house construction, even with the best of materials and workmanship, cannot provide sufficient strength to resist pressures such as existed at the near range.

AD-611 258 Div. 13, 22
CFSTI Prices: HC$3.00 MF$0.75

Ammann and Whitney, New York.
RESPONSE OF PROTECTIVE VAULTS TO BLAST LOADING,
by E. Cohen, E. Laing, and A. Bottenhofer.
Apr 61, 87p
Proj. 30 4
WT 1451

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. A copy is available for public sale.

Descriptors: (*Structures, Explosion effects), (*Nuclear explosion damage, Structures), Nuclear explosions, Shock resistance, Pressure, Blast, Tensile properties, Reinforcing materials, Soil mechanics, Steel, Metal plates, Construction, Design, Thrust, Elasticity.

A reinforced-concrete steel-plate-lined vault and steel vault door were exposed to a nuclear detonation (shot Priscilla, about 37 kt, balloon suspended, at 700 ft) at the predicted 75-psi peak incident pressure level (1150 ft from Ground Zero). The vault was designed by the ultimate-strength theory to utilize the additional strain energy available in the elastoplastic and plastic ranges. Flexural and thrust capacities were determined, and shear capacity was computed. It was established that above-ground structures can be designed and constructed to survive the pressure levels experienced by this structure. The vault and door provided adequate blast and thermal protection for normal usage, and the structure was adequate to resist overturning and excessive sliding under conditions of the test. (Author)

AD-611 259 Div. 13, 20
CFSTI Prices: HC$6.00 MF$1.50

Ammann and Whitney, New York.
TEST OF FRENCH UNDERGROUND PERSONNEL SHELTERS,
by Edward Cohen and Norval Dobbs. Jun 60, 295p
Proj. 30 6
WT 1453

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for Public Sale.

Descriptors: (*Nuclear explosion damage, Underground structures), (*Shelters, Nuclear explosion damage), Blast, Tests, Design, Instrumentation, Reinforced concrete, Reinforcing materials, Steel, Radiation measurement systems, Dosimeters, Radiation damage, Shock waves.

The objective of this project was to investigate the predicted behavior of French underground personnel shelters, equipment, and instrumentation. Data were used for the evaluation and improvement of present designs and for the establishment of design criteria. Five reinforced-concrete underground structures designed by French engineers were tested: one cast-in-place rectangular structure, one precase circular shelter, two entranceways at approximately the 116-psi peak overpressure range, and one entranceway at approximately the 105-psi range. Reinforcing steel, doors, ventilation equipment, precast rings for the circular structure, and instrumentation were shipped from France and incorporated in the shelters. Preshot and postshot precise-location surveys were made to determine the total lateral and vertical motions of the structures as a result of the blast. Shock spectral data indicated substantial transient vertical and horizontal motions. Most test structures sustained very slight damage in the shelter areas.

AD-611 261 Div. 13, 22
CFSTI Prices: HC$3.00 MF$0.75

Sandia Corp., Albuquerque, N. Mex.
EFFECTS OF A PRECURSOR SHOCK WAVE ON BLAST LOADING OF A STRUCTURE,
by J. R. Banister and L. J. Vortman. Oct 60, 76p
Proj. 34 1
WT 1472

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. A copy is available for public sale.

Descriptors: (*Structures, Explosion effects), (*Shock-waves, Loading (Mechanics)), (*Nuclear explosion damage, Structures), Blast, Nuclear explosions, Pressure, Shock resistance, Dust, Measurement.

A 6- by 6- by 20-ft structure located at a distance of 2000 ft from Ground Zero (GZ) was subjected to a precursor wave from the Priscilla shot, a 37-kt balloon shot detonated at an altitude of 700 ft. The wave struck a 6- by 20-ft face of the structure with a peak incident overpressure of between 24 and 26 psi. Free-field measurements of overpressure, dynamic pressure, and force were made at the same radial distance about 25 ft from the end of the structure. Local asymmetries in the blast wave gave different incident conditions for points separated on a fixed radius by only 35 ft. Dust concentrations and dust momentum flux were higher close to the ground than at the 10-ft-high gauge station located near the

structure and contributed significantly to the blast loading on the front of the structure. This dust was accelerated through a high-velocity flow that feeds downward to the lower layers. The unusual oscillation seen in records of overpressures on the structures in earlier tests was again observed. A relation between the incident overpressure and the ratio of the impulse on the structure to the incident impulse is suggested. Similar measurements were made on a 9 2/3- by 11- by 17-ft structure located at a distance of 1150 ft from GZ, where the peak overpressure was 87 psi. (Author)

AD-611 262 Div. 13, 20, 22
CFSTI Prices: HC$4.00 MF$0.75

Sandia Corp., Albuquerque, N. Mex.
COMPARISON TEST OF REINFORCING STEELS,
by R. H. Carlson and J. P. Murtha. Oct 59, 108p
Proj. 34 2
WT 1473
Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
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Descriptors: (*Steel, Reinforced concrete), (*Reinforced concrete, Vulnerability), (*Nuclear explosion damage, Reinforced concrete), Civil engineering, Structures, Reinforcing materials, Railroad tracks, Blast, Loading (Mechanics), Mechanical properties.

The project was planned to determine the relative merits of rail- and intermediate-grade steel as reinforcement in concrete slabs subjected to blast loading. Slab pairs were placed at ground level over deflection chambers and loaded with the incident pressure pulse from a nuclear device. Two station locations were chosed so that the loadings were approximately 7 and 5 psi peak overpressure. The slabs comprising each pair were identical except for the grade of reinforcement in each. Slab strengths were varied, and two test stations were used to increase the probability of realizing the response necessary to emphasize the advantages of each steel grade. Measurements were made of the dynamic midspan slab deflections and the transient loading pulse. A through posttest survey was conducted to determine the severity of the resulting damage to the concrete slabs. Test results indicated that the desired range of slab behavior was achieved. In all cases the rail slabs displayed the more desirable response. However, limitations of this experiment, due to loading and structural conditions, must be considered before this conclusion can be generalized. (Author)

AD-611 267 Div. 13, 25
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
DESIGNING TO PREVENT FATIGUE FAILURES,
by Lloyd Kaechele. Feb 65, 25p Rept. no. P-3022
Unclassified report

Paper prepared for presentation at the Design Engineering Conference, American Society of Mechanical Engineers, New York, 18 May 65.

Descriptors: (*Fatigue (Mechanics), Structures), (*Structures, Fatigue (Mechanics)), Failure (Mechanics), Design, Structural parts, Stresses, Structural properties, Loading (Mechanics).

There are three main problem areas in preventing fatigue failures: prediction of the fluctuating stresses that cause fatigue, behavior of the structural material undergoing these stresses, and scatter in stresses encountered in service and in fatigue behavior. This paper concentrates on these major problem areas. The data most important for design, and some techniques for using these data, are presented and discussed. The designer's role in selecting the fatigue problems that should be studied is emphasized. (Author)

AD-611 440 Div. 13, 1
CFSTI Prices: HC$6.00 MF$1.25

Cincinnati Univ., Ohio. Coll. of Design, Architecture, and Art.
BARE BASE DEVELOPMENT CONCEPTS.
1964, 221p Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
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Descriptors: (*Limited war, Landing fields), (*Landing fields, Limited war), (*Tactical Air Command, Limited war), Support equipment, Cargo vehicles, Transportation, Shelters, Hangars, Landing lights.

A bare base is defined as an airfield having one or more runways, taxiways, and a ramp, but no support facilities. In most cases, the bare base is a commercial airport or an abandoned airfield. Extensive inspection and evaluation are normally required prior to operational use. It is assumed that facilities such as maintenance, housing or administrative buildings, etc. are not available. However, any existing facilities are used to whatever extent possible. The report consists of five sections on the problem of bare base development. Each section is a complete report developed by team from the University of Cincinnati. These five teams researched the problem and prepared design proposals in four major areas: (1) site development, (2) shelter system, (3) transportation system, and (4) miscellaneous equipment.

AD-611 443 Div. 13, 16

Harvard Coll., Cambridge, Mass. President and Fellows.
TREATMENT OF WATER BY FLOTATION.
Final rept. for 1 Jun 52-31 Aug 54,
by Edward W. Moore and George T. Bryant.
31 Aug 54, 42p Unclassified report
Contract DA49 007MD317

Available only for reference use at DDC Field Services.
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Descriptors: (*Water, Purification), (*Flotation (Separation), Water supplies), Decontamination, Bacteria, Amoeba, Viruses, Colloids, Atomization, Ammonium compounds, Air, Electrochemistry, Experimental data, Tables, Graphics, Feasibility studies.

Bacteria, amoebic cysts, and staphylococcus phage particles used as virus simulants, were effectively removed from distilled water suspensions under laboratory conditions, by aerating those suspensions for five to ten minutes with fine bubbles, after addition of 5 or 10 mg/l of several quaternary ammonium compounds. The organisms were presumably either killed by the disinfecting action of the quaternaries, or removed in the foam of air bubbles coming off the suspensions or both. The procedure seemed to offer promise as a means for rapid purification of water with simple equipment in the field. Further investigation showed that the removal was adversely affected by lowering the temperature of the water. It was also adversely affected by several components present in natural waters: those identified in the time available for research were (1) the hardness ions, Ca(++) and Mg(++) (2) trivalent ions such as Al(+++) and presumably Fe(+++) (3) organic color compounds and presumably other organic matter (4) turbidity when present along with factor (1).

14. Materials (Non-Metallic)

AD-610 857 Div. 14, 4, 17, 25
CFSTI Prices: HC$3.00 MF$0.75

Stanford Univ., Calif.
ANNUAL TECHNICAL REPORT NO. 3. MATERIALS RESEARCH.
Rept. for 1 Jul 63-30 Jun 64.
30 Jun 64, 63p
Contract SD-87

Unclassified report

Descriptors: (*Materials, Scientific research), (*Scientific research, Materials), Semiconductors, Masers, Magnetic materials, Ferrites, Hall effect, Luminescence, Crystals, Helium, Magnetic fields, Nuclear magnetic resonance, Organic compounds, Transition elements, Alloys, Oxides, Nickel, Nickel alloys, Inorganic compounds, Lasers, Rutile, Sapphires, Austenite, Alkali metals, Bainite, Solid state physics, Intermetallic compounds.

The report includes information on the total research activity related to the science of materials at Stanford University. In addition to the broad-base support received through Contract SD-87 with the Advanced Research Projects Agency of the Department of Defense, which contributed either directly or indirectly to almost all of this work, the majority of the specific research programs were directly supported by other agencies of the United States Government or by private sources. This report contains brief descriptions of the research programs underway during the period, arranged alphabetically by principal investigator. Also included are lists of publications, oral presentations, Ph.D. dissertations, awards and honors, and relevant personnel.

AD-610 867 Div. 14, 17
CFSTI Prices: HC$5.00 MF$1.00

Dayton Univ., Ohio. Research Inst.
THE EVALUATION OF HIGH TEMPERATURE MATERIALS. SECTION I: EVALUATION OF COATINGS FOR REFRACTORY ALLOYS. SECTION II: MATERIALS EVALUATION WITH AN ARC-PLASMA-JET.
Rept. for Jun 63-Apr 64,
by J. C. Wurst and J. A. Cherry. Sep 64, 170p
Contract AF33 616 7838, Proj. 7381, Task 738103
ML TDR64 62 V2

Unclassified report

See also AD-601 638.

Descriptors: (*Refractory metal alloys, Coatings), (*Heat-resistant materials, Performance (Engineering)), (*Coatings, Oxidation inhibition), (*Niobium alloys, Coatings), (*Molybdenum alloys, Coatings), (*Plasma jets, Test facilities), Composite materials, Effectiveness, Metallography, Ceramic materials, Porous materials, Ablation, Impregnation, Creep, Rupture, Tensile properties, Deformation, Disks, Statistical analysis, Tests.

Section I describes the evaluation of oxidation-resistant coatings for TZM molybdenum (Mo-0.5Ti-0.07Zr-0.03C) and B66 columbium (Cb-5V-5Mo-1Zr). Eight coatings for TZM were evaluated with primary emphasis upon four of these. Six coatings for B66 were evaluated with the bulk of this effort concentrated upon two coating systems. Test results covering complete metallographic analysis, tensile and bend tests, cyclic oxidation tests in the temperature range of 1600 to 3000F, and the results of creep-rupture tests complete with a statistical analysis are presented. Section II describes the screening tests of 32 different high-temperature materials, including ablative materials, impregnated porous ceramics, and refractory composites, in an arc-plasma testing facility. Included are screening data for several refractory materials developed from tests of 1-inch diameter discs. This disc test is described in detail and its relative merits as compared to more conventional flat panel tests are discussed. Materials performance data are presented as a tabulation of test conditions and their effects upon specimen behavior. (Author)

AD-610 876 Div. 14, 25
CFSTI Prices: HC$1.00 MF$0.50

American Optical Co., Southbridge, Mass.
NEODYMIUM LASER GLASS IMPROVEMENT PROGRAM.
Quarterly status rept. no. 10,
by Richard F. Woodcock. 30 Sep 64, 3p
Contracts Nonr383500, DA01 021AMC1066aZ,
Proj. 548; ARPA Order 306 20

Unclassified report

Descriptors: (*Lasers, Materials), (*Neodymium compounds, Lasers), (*Glass, Neodymium compounds), Refractive index, Thermal expansion, Rods, Optical properties, Silicates, Additives, Oxides.

Investigations concerning the effects of thermal gradients on the optical path length of glass lasers and the conversion efficiency of silicate glasses containing Nd203 are summarized.

AD-611 069 Div. 14, 25
CFSTI Prices: HC$6.00 MF$1.50

Research Triangle Inst., Durham, N. C.
STRUCTURE OF DRAWN POLYMERS.
Rept for 1 Apr 63-31 Jul 64,
by A. Peterlin. Dec 64, 270p
Contract AF33 657 11070, Proj. 7342, Task 734202
ML TR-64-351

Unclassified report

Descriptors: (*Fibers (Synthetic), Crystal substructure), (*Polyethylene plastics, Crystal substructure), (*Acetyl plastics, Crystal substructure), (*Nylon, Crystal substructure), (*Polymers, Crystal substructure), Single crystals, Molecular structure, Electron microscopy, Electron diffraction, Nuclear magnetic resonance, Crystal lattice defects, Phase studies, Heat treatment, Deformation, Drawing (Machine processing).

Morphology of deformed single crystals and chain mobility of cold drawn samples of polyethylene, polyoxymethylene and polycaprolactam were investigated by electron microscopy, electron diffraction and nuclear magnetic resonance. Due to the good and uniform adherence of solution grown single crystals of PE on the polyethylene terephathalate substrate, the study of small deformation ratios revealed the details of twinning, phase transformation, chain tilting and slip as functions of crystal orientation and temperature. In order to observe an intermediate case between single crystals and bulk polymers, the deformation of extremely thin polyethylene spherulites was also investigated. The morphology changes at small deformations were very similar to those with single crystals. Nuclear magnetic resonance investigation of cold drawn polyethylene and polyoxymethylene first revealed the marked anisotropy characteristic of the nearly complete uniaxial orientation. Moreover, in polyethylene an intermediate component was observed.

AD-611 076 Div. 14, 4
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SYNTHESIS OF ORGANIC COMPOUNDS AS ADMIXTURES TO LUBRICATING OILS,
by A. M. Kuliev. 21 Jan 65, 7p FTD-TT-64-880
TT 65-61690

Unclassified report

Unedited rough draft trans. of Akademiya Nauk SSSR. Vestnik, 1962, v. 32, no. 7, p. 51-53.

Descriptors: (*Lubricant additives, Synthesis (Chemistry)), Organic compounds, Lubricants, Oils, Stabilization, Antioxidants, Phenols, USSR.

The characteristics of certain Soviet lubricant additives are reviewed, and the synthetic reaction schemes of several of these are given.

AD-611 081 Div. 14
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
AN INVESTIGATION OF FLUORIDE OPTICAL GLASSES,
by P'ei-cheng Teng. 29 Jan 65, 23p
FTD-TT-64-911
TT 65-61693

Unclassified report

Edited trans. of Kuei Suan Yen Hsueh Pao (Chinese People's Republic) 1963, v. 2, no. 4, p. 212-222.

Descriptors: (*Optical materials, Glass), (*Glass, Flourides), (*Fluorides, Glass), Phosphates, Optical properties, Refractive index, Density, Hardness, Stability, Melting, Phase studies, China.

A number of systematic experiments were conducted on the fluoride optical glasses, primarily glasses of the fluoride-phosphate systems. The vitrification regions for these glasses were determined, and their physico-chemical properties, such as refractive index, density, hardness, devitrifying ability and chemical stability were measured. Laws of variation were established for these properties. The possible applications of these new grades of optical glasses are also discussed.

AD-611 090 Div. 14
CFSTI Prices: HC$0.50 MF$0.50

Rock Island Arsenal, Ill.
COMPARISON OF AUTOMOTIVE LUBRICATING GREASES.
Technical rept.,
by S. Fred Calhoun, Richard Faoro, and R. L. Young.
21 Dec 64, 12p Rept. no. 64-3578
Proj. 1C0 24401A107

Unclassified report

Descriptors: (*Greases, Passenger vehicles), Lubrication, Antioxidants, Performance (Engineering), Tests, Bearings, Penetration, Stability, Roll.

Six commercial automotive greases were secured from local dealers and evaluated along with one qualified MIL-G-10924B grease. The tests used were, worked penetration, Four Ball wear and Extreme Pressure, roll stability, water washout, water resistance and rust prevention. These tests are all found in the ASTM Manual or in Specification MIL-G-10924B. Results indicate the MIL-G-10924B grease to be better than average in wear, EP, and roll stability and superior in rust prevention and water resistance. (Author)

AD-611 103 Div. 14, 13
CFSTI Prices: HC$1.00 MF$0.50

Forest Products Lab., Madison, Wis.
MINIMUM WEIGHT STRUCTURAL SANDWICH.
Research note,
by Edward W. kuenzi. Jan 65, 19p FPL-086
Contract AF33 657 63 358

Unclassified report

Descriptors: (*Sandwich panels, Weight), (*Loading (Mechanics), Sandwich panels), Sandwich construction, Compressive properties, Deformation, Stiffened cylinders, Stresses, Mathemical analysis.

This note presents theoretical analyses for determination of dimensions of structural sandwich of minimum weight that will have certain stiffness and load-carrying capabilities. Included is a brief discussion of the resultant minimum weight configurations. (Author)

AD-611 143 Div. 14, 30
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., Bridgeport, Conn.
REINFORCED PLASTIC MAGNETIC TAPE.
Quarterly rept. no. 4, 1 Dec 62-31 Mar 63,
by N. Kirk, D. McBournie, and A. Lassila.
31 Mar 63, 29p
Contract DA36 039SC88951, Proj. 3A99 15 003

Unclassified report

See also AD-287 215.

Descriptors: (*Magnetic tape, Data storage systems), (*Magnetic recording systems, Magnetic tape), (*Reinforcing materials, Magnetic tape), Elastomers, Plastics, Silicone plastics, Glass, Glass textiles, Carbonates, Binders, Data processing systems, Tensile properties, Coatings, Nitriles, Oxides, Analysis, Manufacturing methods, Reliability (Electronics), Tests.

Magnetic tape base materials possess inadequacies in certain critical data storage applications. The objective of the project is to develop backing materials which will improve the efficiency and reliability of automatic data processing equipment and astroelectronic recording devices. Evaluations of weave construction and continuous production processes for a promising new fabric were initiated. Investigation of a new polycarbonate elastomer as a resin binder commenced. Physical testing emphasized wet strength retention and tear strength measurements. A nitrile silicone fluid as primer exhibited exceptional wet strength retention. Precision slitting experience was gained. Final tape samples, the first requiring semi-continuous processing equipment, were supplied. A glass-reinforced magnetic tape base with advantages warranting continued development was achieved. (Author)

AD-611 215 Div. 14
CFSTI Prices: HC$1.00 MF$0.50

Textile Research Inst., Princeton, N. J.
EFFECT OF TEMPERATURE AND DRAW-RATIO ON FORCE-EXTENSION PROPERTIES OF TWISTED FIBERS,
by Dusan C. Prevorsek and W. James Lyons.

Jan 65, 17p Technical rept. no. TR-4
Contracts Nonr418400, Nonr418401

Unclassified report

See also AD-601 169

Descriptors: (*Fibers, Deformation), (*Fibers (Synthetic), Tensile properties), Temperature, Nylon, Acrylic resins, Polyester plastics, Failure (Mechanics).

When single fibers are twisted under constant tension before testing, a decrease in strength is observed. This reduction in strength is generally small with fibers having low orientation (low draw-ratio) and increases as the draw-ratio increases. The difference in the strength resulting from twist is negatively correlated with temperature. (Author)

AD-611 263 Div. 14, 20
CFSTI Prices: HC$2.00 MF$0.50

Federal Civil Defense Administration, Battle, Creek, Mich.
PENETRATION INTO CONCRETE OF GAMMA RADIATION FROM FALLOUT,
by W. F. Titus. Apr 59, 28p
Proj. 35 1
WT 1477

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Concrete, Radiation damage), (*Radioactive fallout, Penetration), (*Nuclear explosion damage, Concrete), Gamma rays, Radiation measurement systems, Sandwich construction, Time.

The penetration into concrete of gamma radiation from fallout has been measured in an idealized geometry as a function of time after the detonation of a nuclear device. At the same time, the exposure dose rate in air at heights of 3 and 9 ft above the ground was measured with two detectors suspended from a tower and shielded from above with lead so as to be sensitive primarily to radiation from fallout on the ground. For this test a 'sandwich' made of seven concrete slabs, forming a mass of concrete with face dimensions large enough to reduce edge effects to a negligible amount, was buried with its top surface flush with the ground. Remote-reading detectors were placed between the concrete slabs, thus permitting measurements of dose rate as a function of depth in concrete. The concrete mass and the tower were located in the center of a cleared and leveled area approximately 200 yd in diameter. Thus the gamma radiation at the detectors originated from an essentially infinite-plane source of radiation. Results are presented both as a function of time after detonation and of depth of penetration of the radiation into concrete. A comparison of the results with theoretical calculations is made. (Author)

AD-611 376 Div. 14, 17
CFSTI Prices: HC$2.00 MF$0.50

IIT Research Inst., Chicago, Ill.
HIGH-TEMPERATURE OXIDATION PROTECTIVE COATINGS FOR VANADIUM-BASE ALLOYS.
Final rept. for 1 Oct 63-30 Sep 64.
1 Dec 64, 43p IITRI-B6019-6
Contract NOw64 0140c

Unclassified report

See also AD-605 616.

Descriptors: (*Coatings, Vanadium alloys), (*Vanadium alloys, Silicon coatings), (*Silicon coatings, Vanadium alloys), Niobium alloys, Titanium alloys, Oxidation, Protective treatments, Antioxidants, High-temperature research, Sheets, Ductility, Tensile properties, Transition, temperature, Brittleness, Life expectancy, Tin, Silicon, Silver, Copper, Aluminum, Niobium.

The objective of this program was the development of oxidation-protective coatings for vanadium-base alloys for use at 1800 to 2500F. Specifically, the effect of the pack-siliconizing process and the silicide coating itself on the mechanical properties of 0.020 in. thick sheet of V-60Cb-1Ti (weight per cent) has been studied. Results indicate that both of the above parameters have little effect on strength, but causes some reduction in tensile ductility. However, the tensile transition temperature remains less than -320F after coating. Also, there is little or no embrittlement of this coated sheet after twenty-five 4 hr oxidation cycles at temperatures up to 2300F in static laboratory air. At reduced pressures, 100-1,000 microns useful life is at least ten 2 hr cycles at the above temperatures. Initial development of an oxidation resistant slurry or liquid cementation type of coating for V-60Cb-1Ti has been completed. Slurry compositions containing tin, silicon, silver, copper, aluminum, and columbium have been investigated; several of these show good coverage, even at corners and edges. The static oxidation life of other vanadium-base alloys, coated by the pack-siliconizing process, has also been investigated. V-40Cb-30Ta-1Ti, the most promising of these alloys, has an oxidation life of about 50 hr at 2200F, and less under cyclic conditions. (Author)

AD-611 377 Div. 14, 25
CFSTI Prices: HC$1.00 MF$0.50

Keck (W. M.) Lab. of Engineering Materials,
Calif. Inst. of Tech., Pasadena.
A CROSS LINKED POLYMER STANDARD. FIRST REPORT ON POLYMER SELECTION.
Polymer science rept.,
by W. G. Knauss. Jun 64, 8p MATSCIT-PS-64-5
Contract AF04 611 9572

Unclassified report

Descriptors: (*Polymers, Standards), (*Standards, Polymers), (*Elastomers, Standards), (*Viscoelasticity, Standards), Plastics, Transition temperature, Optical properties, Preparation, Stability, Colloids, Molecular structure, Crystal structure, Selection.

A series of 12 different cross-linked polymers were screened as possible standards for viscoelasticity studies. Characteristics examined were glass transition temperature, optical clearness, stress optical sensitivity, reproducibility, mode of preparation, chemical stability before and after curing, swelling, sol fraction, chemical structure, crystal structure, and ease of structural variability.

AD-611 380 Div. 14, 25
CFSTI Prices: HC$1.00 MF$0.50

Keck (W. M.) Lab. of Engineering Materials,
Calif. Inst. of Tech., Pasadena.
A CROSS LINKED POLYMER STANDARD. SECOND REPORT ON POLYMER SELECTION.
Polymer science rept.,
by W. G. Knauss. Dec 64, 8p MATSCIT-PS-64-9
Contract AF04 611 9572

Unclassified report

See also AD-611 377.

Descriptors: (*Polymers, Standards), (*Standards, Polymers), (*Elastomers, Standards), (*Viscoelasticity, Standards), Plastics, Isocyanate plastics, Polyethylene plastics, Acrylic resins, Optical properties, Strain (Mechanics), Vegetable oils.

For the purpose of selecting a standard for viscoelasticity studies, a series of three different crossed-linked polymers were examined in detail with regard to their optical clearness and stress optical sensitivity. The polymers considered were a polyurethane prepolymer cross linked with castor oil, ethylene-propylene rubber, and butyl methacrylate.

AD-611 396 Div. 14, 4, 31
CFSTI Prices: HC$1.00 MF$0.50

American Oil Co., Whiting, Ind.
DEVELOPMENT OF NONFLAMMABLE HYDRAULIC FLUID.
Bimonthly progress rept. no. 5, 1 Dec 64-1 Feb 65,
by K. R. Bunting, A. M. Dobry, E. A. Swakon, P. C. Vienna, and L. W. Mixon. 1 Feb 65, 10p
Contract Nobs90267, Proj. SR001 03 01, Task 606
Unclassified report

See also AD-609 391.

Descriptors: (*Hydraulic fluids, Synthesis (Chemistry)), Flammability, Lubricants, Ships, Pumps, Compatibility, Sea water, Corrosion inhibition, Polymers, Toxicity, Storage, Polyethylene plastics, Handling, Wear resistance, Additives, Materials, Construction.

The object of the study is the development of a water-base hydraulic fluid which (1) yields a fire-resistant non-aqueous residue, (2) is compatible with materials of construction and sea-water contamination, (3) satisfactorily lubricates shipboard pumps, (4) presents no unusual storage or handling problems, and (5) exhibits no toxicological hazards under conditions of use. Low-density polyethylene can be chlorophosphonated by reaction with phosphorus trichloride and oxygen. Hydrolysis and neutralization produces products which show considerable promise as thickeners. Fluids prepared from products from 21,000-molecular-weight polyethylene have been found to exhibit undesirable viscosity instability and high wear in Vickers Vane pumps. Viscosity instability is much less pronounced when 12,000-molecular-weight polymer is used to prepare the thickeners and 18% of potassium ethane phosphonate, added as a pour depressor, is present. High pump wear, however, is still a problem. Work on the development of an antiwear additive has begun. Flammability characteristics and compatibility with materials of construction and 10% sea water do not appear to be problems with these fluids. (Author)

AD-611 454 Div. 14, 4

Aberdeen Univ. (Scotland).
THE SYSTEM CaO-Ga_2O_3.
Revised ed.,
by J. Jeevaratnam and F. P. Glasser. 9 Jun 61, 4p
AFOSR 2374
Unclassified report

Pub. in American Ceramic Society. Journal (U. S.) v44 n11 p563-66 Nov 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Calcium compounds, Oxides), (*Gallium compounds, Oxides), (*Oxides, Phase studies), (*Ceramic materials, Phase studies), Glass, Sintering, Quenching (Cooling), Chemical reactions.

CaO and Ga_2O_3 form three compounds: 3CaO.-Ga_2O_3, CaO.Ga_2O_3, and CaO.$2Ga_2O_3$. 3CaO.-Ga_2O_3 melts incongruently to CaO plus liquid at 1263C.; CaO.Ga_2O_3 and CaO.$2Ga_2O_3$ melt congruently at 1369 and 1504C. respectively. Eutectics are located at the following temperatures and compositions (in mole % Ga_2O_3): between 3CaO.Ga_2O_3 and CaO.Ga_2O_3, 1245C. and 37.5%; between CaO.Ga_2O_3 and CaO.-$2Ga_2O_3$, 1323C. and 57.0%; and between CaO.-$2Ga_2O_3$ and beta-Ga_2O_3, 1457C. and 68.0%. There is a peritectic at 1263C. and 36.0%. Three polymorphs of CaO.Ga_2O_3 are described. Compositions from approximately 35 to 70 mole % Ga_2O_3 can be quenched to yield homogeneous glasses. (Author)

15. Mathematics

AD-610 841 Div. 15, 9
CFSTI Prices: HC$1.00 MF$0.50

Institute for Fluid Dynamics and Applied Mathematics, Univ. of Maryland, College Park.
REGULARITY OF CERTAIN EXPLICIT SOLUTIONS TO LAPLACE'S EQUATION AT ARTIFICIAL INTERFACES,
by Robert B. Kelman. Aug 64, 13p
Technical note BN-368
Contract Nonr595 17

Unclassified report

Prepared in cooperation with Howard Univ., Washington, D. C.

Descriptors: (*Partial differential equations, Theory), Boundary value problems, Harmonic analysis, Potential theory, Temperature, Bessel functions, Fourier analysis, Series.

AD-610 842 Div. 15
CFSTI Prices: HC$2.00 MF$0.50

Institute for Fluid Dynamics and Applied Mathematics, Univ. of Maryland, College Park.
HEREDITARY DEPENDENCE IN THE THEORY OF DIFFERENTIAL EQUATIONS. PART I,
by G. Stephen Jones. Jan 65, 44p Technical Note BN-385
Contracts AF49 638 1242, NASw845

Unclassified report

Descriptors: (*Differential equations, Theory), (*Difference equations, Differential equations), Functional analysis, Mapping transformations, Mechanics, Time-lag theory.

A general class of differential equations with hereditary dependence is introduced which includes most equations of hereditary type encountered in applications with the notable exception of equations of neutral type. Furthermore, the class introduced allows the development of a strong and tractable qualitative theory closely resembling that of ordinary differential equations. Much of the linear analysis and the stability theory as developed by J. K. Hale for a more restricted class of hereditary equations carries over directly. However, only results associated with existence and uniqueness of solutions and dependence on initial data and parameters will be considered herein.

AD-610 844 Div. 15
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif.
THE CONVEX HULL OF A RANDOM SET OF POINTS.
Technical rept. no. 103,
by Bradley Efron. 25 Jan 65, 31p
Contract Nonr22552, Proj. NR342 022

Unclassified report

See also AD-607 796.

Descriptors: (*Geometry, Probability), (*Convex bodies, Measure theory), (*Convex sets, Probability), Distribution theory, Stochastic processes, Transformation (Mathematics), Mathematical prediction.

Various expectations connected with the convex hull of a random set of points are derived. The points are chosen independently in the plane or in higher dimensions, and formulas are given for the expected area, perimeter, volume, number of vertices. The formulas are particularly simple for an underlying normal distribution. (Author)

AD-610 845 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif.
ON A CHARACTERIZATION OF THE THREE LIMITING TYPES OF THE EXTREME.
Technical rept. no. 104,
by J. Sethuraman. 1 Feb 65, 16p
Contract Nonr22552, Proj. NR342 022

Unclassified report

Descriptors: (*Distribution theory, Functional analysis), (*Functional analysis, Distribution theory), Statistical analysis, Distribution, Stochastic processes, Statistical functions, Life expectancy.

If X and Y are independent random variables then they are said to be completely confounding if the distributions of Z, Z conditional on Z = X, Z conditional on Z = Y are the same. If X, Y, and Z completely confound one another where Y and Z have the same distribution as aX + b and cX + d which are basically different linear functions, then the distribution of X is one of the three limiting types of the extreme (minimum) observation from independent samples from the same population. (Author)

AD-610 950 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Operations Research Center, Univ. of California, Berkeley.
GENERALIZED UPPER BOUNDED TECHNIQUES FOR LINEAR PROGRAMMING - I,
by George B. Dantzig and Richard M. Van Slyke.
5 Aug 64, 24p ORC-64-17 (RR)
Contract Nonr22283; Grant NSF GP2633

Unclassified report

Report is part of paper entitled 'Large Scale Linear Programming' presented at the IBM Symposium on Combinatorial Methods, Mar 64.

Descriptors: (*Linear programming, Optimization), Theorems, Operations research, Matrix algebra, Iterative methods.

A variant of the simplex method is given for solving linear programs with M + L equations, L of which have the property that each variable has at most one nonzero coefficient. Special cases include transportation problems, programs with upper bounded variables, assignment and weighted distribution problems. The main feature of the algorithm is that a working basis of order 2M + 1 is utilized for pivoting, pricing, and inversion which for large L can be of significantly lower order than that of the original system. (Author)

AD-610 951 Div. 15
CFSTI Prices: HC$2.00 MF$0.50

Operations Research Center, Univ. of California, Berkeley.
A FEASIBILITY CONJECTURE RELATED TO THE HIRSCH CONJECTURE,
by Richard Wollmer. 23 Oct 64, 30p ORC-64-28 (RR)
Contract Nonr22283; Grant NSF GP2633

Unclassified report

Descriptors: (*Matrix algebra, Linear programming), (*Linear programming, Matrix algebra), Sequences, Transformations (Mathematics), Tables, Operations research.

A very important unsolved problem in linear programming today is the validity or nonvalidity of the conjecture which follows: Hirsch Conjecture: Let X and Y be feasible bases to the linear programming problem Y > or = O, X > or = O, IY + BX = b and let m be the rank of this system. Then the conjecture is that there exists a sequence of m feasible pivot operations that transforms the system into Y > or = O , X > or = O, (1/B)Y + IX = (1/B)b. That is to say a sequence such that each of the m - 1 intermediate bases is feasible.

AD-610 955 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

John Hopkins Univ., Baltimore, Md.
THE FIRST MEDIAN TEST: A TWO-SIDED VERSION OF THE CONTROL MEDIAN TEST.
Technical rept.,
by Joseph L. Gastwirth. Feb 65, 18p
Contract Nonr401009, Proj. NR042 232
Unclassified report

See also AD-610 158.

Descriptors: (*Statistical tests, Statistical data), (*Sampling, Statistical data), Life expectancy, Population (Mathematics), Probability, Distribution theory, Monte Carlo method.

Consider two independent samples of mutually independent observations, s sub 1...x sub m and y sub1...y sub n respectively from F(x) and G(x). Let v be the number of x's occurring before the median of the y sample and u be the number y's occurring before the median of the x sample. Kimball, Burnett and Doherty proposed a control median test based on it (where the x sample is from the control group). In the present paper a two-sided version of this test is proposed, based on u if the median of the x sample precedes the median of the y sample, as otherwise, the test is based on v. The asymptotic distribution theory of both tests is developed under both the null and alternative hypotheses. The expected time to reach a decision is also discussed. (Author)

AD-610 991 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Northwestern Univ., Evanston, Ill.
A FLUCTUATION THEOREM FOR CYCLIC RANDOM VARIABLES,
by Meyer Dwass. 1960, 7p
Contract AF49 638 877
AFOSR J24
Unclassified report

Descriptors: (*Groups (Mathematics), Theorems), (*Probability, Groups (Mathematics)), Number theory, Permutations, Distribution theory, Numbers, Stochastic processes.

AD-611 095 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif., School of Humanities and Sciences.
ON APPROXIMATE CALCULATIONS OF THE EIGENVALUES AND EIGENFUNCTIONS OF BOUNDARY VALUE PROBLEMS IN PARTIAL DIFFERENTIAL EQUATIONS,
by V. A. Efimenko. 24 Nov 64, 24p
Technical rept. no. CS-14
Contract Nonr-225(37), Proj. NR-044-211
TT 65-61724
Unclassified report

Trans. of Akademiya Nauk SSSR. Izvestiya. Seriya Matematicheskaya, 1938, p. 613-623.

Descriptors: (*Boundary value problems, Partial differential equations), (*Partial differential equations, Boundary value problems), (*Numerical analysis, Boundary value problems), Functions, Difference equations.

AD-611 113 Div. 15, 12
CFSTI Prices: HC$1.00 MF$0.50

Coordinated Science Lab., Univ. of Illinois, Urbana.
A CONSTRAINT MAPPING TECHNIQUE FOR SYSTEM OPTIMIZATION,
by Stephen J. Kahne. 5 Nov 62, 24p Rept. no. R-155
Contract DA36 039SC85122, Task 3 99 01 002
N63 19775
Unclassified report

Descriptors: (*Mapping (Transformations), Control systems), (*Control systems, Mapping (Transformations)), (*Control, Numerical methods and procedures), Nonlinear systems, Set theory, Guidance, Linear systems, Trajectories, Optimization.

Physical constraints on complex systems are often specified in both the state space and control space. A technique is presented in this paper for digital computation to determine if the specifications are mutually consistent with the system dynamics and, if so, for mapping all constraints into the control space. The method is applicable to nonlinear, non-stationary systems. However, closed form solutions are given for linear non-stationary systems. Some examples show application of the technique to linear and nonlinear systems. (Author)

AD-611 176 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif. Dept. of Statistics.
CALCULATION OF UPPER TAIL PERCENTILES FOR THE CHI-SQUARE DISTRIBUTION,
by Herman Rubin and James V. Zidek. 1 Dec 64,
17p Technical rept. no. TR-102
Contract Nonr-22552, Proj. NR342 022
Unclassified report

Descriptors: (*Statistical distributions, Iterative methods), (*Iterative methods, Statistical distributions), Continued fractions, Probability, Integrals, Sequences, Power series.

A procedure is described for determining upper tail percentiles of the chi-square distribution with an arbitrary number of degrees of freedom. An effective iterative technique is described for solving equations of the form f(x) = 0, given the feasibility of computing f and its derivatives. Then, this technique is applied to the chi-square distribution by the continued fraction approximation to the tail integral of the chi-square density function. An alternative procedure is given for the cases in which the sequence of approximants to this continued fraction converge slowly.

AD-611 205 Div. 15, 30
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.

ON PROVING THEOREMS IN PLANE GEOMETRY VIA DIGITAL COMPUTER,
by Richard Bellman. Feb 65, 5p Rept. no. P-3068
Unclassified report

Descriptors: (*Geometry, Theorems), (*Digital computers, Geometry), Algebra, Identities, Mathematical logic.

The report indicates how geometric theorems can be transformed into algebraic identities (the contribution of Descartes), and then established by the verification of a finite number of cases. The verification is arithmetic.

AD-611 273 Div. 15, 1, 26
CFSTI Prices: HC$4.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Washington, D. C.
ANALYSIS OF THE EFFECT OF VARIANCE ON LINEAR PROGRAMMING PROBLEMS.
Master's thesis,
by Louie B. Chester. Aug 64, 105p
Rept. no. GRE/SM/64-1
Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Linear programming, Analysis of variance), (*Analysis of variance, Linear programming), Stochastic processes, Decision theory, Programming (Computers), Management engineering, Reliability, Mathematical prediction, Operations research.

Three linear programs (LP) were studied to determine the effect of variance on problem solutions. IBM 1620 and 7090 computers were used to solve the LP problems as their payoff coefficients were varied within specified limits by random number generators. Analysis was based on relative frequency that various activities were selected at various deviations levels and the implicit prices of non selected activities. Analysis of the means and standard deviations of implicit prices provided methods for measuring and predicting the sensitivity of LP problems. Similarities in behavior or problems having different degrees of sensitivity indicate general applicability of the analyses. (Author)

AD-611 295 Div. 15

Aarhus Univ. (Denmark).
DETERMINANTS OF A CERTAIN CLASS OF NON-HERMITIAN TOEPLITZ MATRICES,
by Glen Baxter and Palle Schmidt. 29 Nov 60, 8p
Contract AF61 052 42; Grant AF AFOSR61 4
AFOSR 232
Unclassified report

Pub. in Mathematica Scandinavica (Denmark) v9 p122-8 1961 (copies available only to DDC users).

Descriptors: (*Determinants, Matrix algebra), (*Matrix algebra, Determinants), (*Identities, Determinants), Complex variables, Series, Polynomials, Denmark.

In this paper the authors establish an elementary identity between two determinants and illustrate its use as at a tool for investigating a certain class of Toeplitz determinants. The feature of the identity which makes it useful in such investigations is that it equates a determinant of 'large' order n to one of fixed 'small' order k. Thus, using only elementary techniques, precise information can be obtained on the asymptotic behavior of certain n x n Toeplitz determinants as n becomes infinite.

AD-611 304 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
AN IRREDUCIBLE GRAPH CONSISTING OF A SINGLE BLOCK.
Memo. rept.,
by T. A. Brown and R. A. Duke. Feb 65, 18p
Rept. no. RM-4340-PR Unclassified report
Contract AF49 638 700

Descriptors: (*Graphics, Geometry), Topology, Groups (Mathematics), Geometric forms, Algebra, Electrical networks.

A single-block graph G sub n (n = 2, 3, ...) is described, and is proven to be n-irreducible in the sense of J. W. T. Youngs. (Author).

AD-611 305 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
DYNAMIC PROGRAMMING, GENERALIZED STATES, AND SWITCHING SYSTEMS.
Memo. rept.,
by Richard Bellman. Feb 65, 12p
Rept. no. RM-4474-PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Dynamic programming, Adaptive control systems), (*Adaptive control systems, Dynamic programming), Control, Switching circuits, Optimization, Equations, Vector analysis, Iterative methods.

In this paper, an alternative formulation is presented in dynamic programming terms which is independent of the dimension of x, the state vector. It is based upon an extension of the concept of state variable and has application to a number of systems with switching characteristics. In its simplest form, the approach was used in the study of adaptive control processes.

AD-611 314 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Research Triangle Inst., Durham, N. C.
THE MOMENTS OF THE NUMBER OF CROSSINGS OF A LEVEL BY A STATIONARY NORMAL PROCESS,
by Harald Cramer and M. R. Leadbetter. Feb 65, 16p SU-181, Technical rept. no. TR-3
Contract Nonr456500, Proj. NR042 246
Unclassified report

Descriptors: (*Statistical processes, Distribution theory), (*Distribution theory, Statistical processes), Stochastic processes, Probability, S-matrix, Inequalities, Theorems.

In this report, the number N of upcrossings of a level U by a stationary normal process is considered, possessing, with probability one, a continuous sample derivative. A formula is obtained for the given factorial moment of arbitrary orders and under conditions which are very close to the necessary ones.

AD-611 331 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Michigan Univ., Ann Arbor. Dept. of Mathematics.
AN ARTIN'S CONJECTURE AND P-ADIC ANALYSIS,
by R. R. Laxton. 26 Jun 64, 2p
Grant Nonr G00017 64, Proj. NR043 303
Unclassified report

Descriptors: (*Algebra, Number theory), (*Number theory, Algebra), Polynomicals, Invariance, Numerical analysis.

AD-611 366 Div. 15
CFSTI Prices: HC$4.00 MF$1.00

Stanford Univ., Calif. School of Humanities and Sciences.
COMPUTER SEARCH FOR NON-ISOMORPHIC CONVEX POLYHEDRA,
by Donald W. Grace. 29 Jan 65, 147p
Technical rept. no. CS-15 Unclassified report
Contract Nonr22537, Proj. NR044 211

Descriptors: (*Convex sets, Combinatorial analysis), (*Programming (Computers), Convex sets), Geometric forms, Topology, Mathematical logic, Mapping (Transformations), Algebra.

To classify the polyhedra, to survey the polyhedral shapes, and to exhaust their variety by orderly enumeration is a naturally attractive problem, noticed by Euler and Jakob Steiner, to which some mathematicians, especially Max Bruckner, devoted considerable work. With the latest high-speed digital computers decades of manual labor can be compressed into hours. This dissertation is concerned with the solution of the enumeration problem on a digital computer. A tri- linear polyhedron is one in which each vertex is incident with exactly three edges. Two polyhedra are isomorphic if a one-to-one correspondence can be established between the vertices, edges, and faces of one with those of the other, so that the incidence relations between elements are preserved. Two polyhedra are called equi-surrounded if a one-to-one correspondence can be established between the faces of one and the faces of the other so that each pair of corresponding faces has equivalent surroundings -- i. e. the neighbors of the two faces in question, when taken in cyclic order clockwise, display the same pattern of edge-counts. Isomorphism implies equisurroundedness. A counter-example with 18 faces disproves the converse. However, for polyhedra with up to 17 faces we can apparently equate isomorphism with equisurroundedness.

AD-611 385 Div. 15

Rice Univ., Houston, Tex.
HOLOMORPHIC FUNCTIONS, OF ARBITRARILY SLOW GROWTH, WITHOUT RADIAL LIMITS,
by G. R. Mac Lane. 29 Sep 61, 5p
Contract AF49 638 205 Unclassified report
AFOSR 3260
Pub. in Michigan Mathematical Journal (U. S.) v9 p21-24 1962 (Copies not available to DDC or Clearinghouse customers)

Descriptors: (*Functions, Theory), Set theory, Polynomials, Series.

AD-611 405 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Institute for Fluid Dynamics and Applied Mathematics, Univ. of Maryland, College Park.
STABILITY AND ASYMPTOTIC FIXED POINT THEORY,
by G. Stephen Jones. Feb 65, 16p
Technical note BN-387
Contract Nonr59517
Unclassified report

Descriptors: (*Convex sets, Mapping (Transformations)), (*Mapping (Transformations), Convex sets), Functional analysis, Set theory, Differential equations, Topology.

An asymptotic fixed point theorem is developed as a generalization of the Schauder fixed point theorem which states: if S is a closed convex subset of a Banach space X, every continuous compact mapping of S into itself has a fixed point. When it is difficult or impossible to identify a set S with appropriate properties and such that T(S) is a subset of S and when the functional equation exhibits strong asymptotic or stability properties as the independent variable becomes very large, then the asymptotic fixed point theory is needed.

AD-611 427 Div. 15
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif. School of Humanities and Sciences.
MAXIMIZING A SECOND-DEGREE POLYNOMIAL ON THE UNIT SPHERE,
by George E. Forsythe and Gene H. Golub.
5 Feb 65, 35p Technical rept. CS16
Contract Nonr22537, Proj. NR044 211 Unclassified report

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Descriptors: (*Differential geometry, Polynomials), (*Polynomials, Differential geometry), (*Matrix algebra, Real numbers), Calculus of variations, Complex numbers, Partial differential equations, Least squares method.

Let A be a hermitian matrix of order n, and b a known vector in C(n). The problem is to determine which vectors make phi(x) = (x-b)(H)A(x-b) a maximum or minimum on the unit sphere U = (x : x(H)x = 1). The problem is reduced to the determination of a finite point set, the spectrum of (A,b). The theory reduces to the usual theory of hermitian forms when b = O.

16. Medical Sciences

AD-610 863 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Brooks Hospital, Inc., Brookline, Mass.
THE REGULATION OF PHOTOSYNTHETIC ACTIVITY IN CHLAMYDOMONAS REINHARDI.
Final technical rept.,
by G. C. McLeod. 25 Apr 64, 25p
Contract AF19 604 8443
AFCRL 64 342

Unclassified report

Descriptors: (*Photosynthesis, Algae), (*Algae, Photosynthesis), Mutations, Proteins, Enzymes, Chlorophylls, Pigments, Photochemistry, Growth.

The y-2 mutant strain of the unicellular green alga Chlamydomonas reinhardi can be caused to undergo bleaching and regreening under rigidly defined and controllable conditions. The development of several photosynthetic reactions during the regreening process were studied. The rates of several reactions remained constant during the first two to three hours of regreening and then increased rapidly. It is suggested that this rapid increase in photosynthetic activity is triggered by the development of a structurally active chloroplast or sub-unit of the chloroplast. This structural unit could provide for physical separation of products and even for their transport to regions of the cell suitable for their protection and metabolism. It is certain that the proteins, particularly the chloroplastic proteins, play a predominant role since the function of the chlorophylls not only depends on the activity of several enzymes, but also on photochemical reactions in which the properties of the pigment-protein complex are essential features. Several forms of this complex appear to exist and to be able to change into one another during development. The regreening cell is a dynamic system whose photosynthetic capabilities are bound to the chloroplast and vary with the environmental conditions. (Author)

AD-610 878 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Los Angeles.
HORMONE ACTION MECHANISM.
Final rept.,
by Blaine H. Levedahl. 1964, 5p
Contract Nonr23339, Proj. NR108 336

Unclassified report

Descriptors: (*Hormones, Biochemistry), Testosterone, Serum albumin, Proteins, Molecular association, Desoxyribonucleic acids, Ribonucleic acids, Adenosine phosphates, Microorganisms, Steroids, Growth, Molecular rotation.

The problem areas investigated were: (1) The interaction of neutral molecules with proteins. (The system used was testosterone binding with serum albumin.) (2) Rotatory dispersion studies in which the original intent was to detect and elucidate the conformational changes that occur in serum albumin when it binds testosterone. (3) Microorganism studies to determine the effect of steroids on biological cells and to attempt to determine if there were any characteristics of steroid effects common to the different cells that would permit interpretation in terms of binding mechanisms. The cell types decided upon were: (1) the red cell, (b) the nerve cell and (c) a free living protozoa, Euglena gracilis. Preliminary studies indicated that the presence of the steroid did influence the lysing time of the RBC but the possiblity of interpretation seemed remote. Diffusion problems of the steroid through the myelin sheath of the nerve resulted in no follow-up of this problem. However, steroids did have an effect on the growth of E. gracilis.

AD-610 886 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario)
CHANGES IN WATER-SALT EXCHANGE IN RADIO-PHOSPHORUS-INDUCED RADIATION SICKNESS IN RABBITS,
by M. A. Khvoinitskaya. Oct 60, 5p
T-345-R
TT 61-25413

Unclassified report

Trans. of Meditsinskaya Radiologiya (USSR) 1959, v. 4, no. 4, p. 88-90.
Also available from NRC mi$1.00, ph$1.50 as NRC-C-3649.

Descriptors: (*Blood chemistry, Radiation effects), (*Radiation effects, Blood chemistry), (*Urine, Radiation effects), Radiation sickness, Phosphorus, Radioactive isotopes, Blood plasma, Blood serum, Blood coagulation, Water, Salts, Calcium, Chlorides, Lethal dosage, Leukocytes, Rabbits, USSR.

In acute radiation sickness induced by subcutaneous injection of P32 in a lethal dosage (2.5 microcuries/gram), there was observed in the majority of rabbits during the first one or two days, an increased elimination of water in the urine, with no change of water intake. During the subsequent few days, urination fell below the original figures, after which it again gradually increased and reached a maximum three to five days before the death of the animals. During the last days of life, diuresis sharply decreased to figures below initial levels. In some cases there was anuria. On several days during the radiation sickness, the content of water in the rabbits' blood serum increased by 0.6 to 3.6% as compared with initial levels. More significant was the 0.5 to 8.5% increase of water in the whole blood as compared with the initial levels. In the majority of the rabbits, during the period of radiation sickness, the content of chlorides in the blood plasma and of calcium in the blood serum fell to amounts below initial levels. It was noted that the amount of chlorides in the urine decreased as compared with initial levels. (Author)

AD-610 890 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario)
AMMONIA AND GLUTAMINE OF THE BRAIN UNDER CONDITIONS OF ELEVATED OXYGEN PRESSURE,
by Z. S. Gershenovich and A. A. Krichevskaya.
Feb 61, 6p T-351-R
TT 61-22091

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady 1954, v. 95, no. 4, p. 837-840.
Also available from NRC mi$0.50, ph$1.50 as NRC-C-3586.

Descriptors: (*Ammonia, Convulsive disorders), (*Glutamine, Convulsive disorders), (*Convulsive disorders, Biochemistry), (*Oxygen, Poisoning), Brain, Toxicity, Cerebral cortex, Central nervous system, Pressure, Adenosine phosphates, USSR.

The research was undertaken for the purpose of studying the dynamics of ammonia conversion in the brain at different stages of oxygen poisoning, and also to determine the character of the mechanisms whereby ammonia is bound in the brain.

AD-610 895 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ON THE QUESTION OF THE PATHOLOGY AND CLINICAL TREATMENT OF GENERAL AND LOCAL HYPOTHERMIA (A RESUME). STATE OF PERIPHERAL INNERVATION IN FROSTBITE (SHORT NOTE),
by T. Ya. Arev and G. I. Plesso. 11 Oct 50, 22p
T-18-R
TT 65 61624

Unclassified report

K Voprosu o Patologii i Klinike Obshchego i Mestnogo Okhazhdeniya, trans. of Klinicheskaya Meditsina (USSR) 1950, v. 28, no. 3, p. 15-24; Zhurnal Nevropatologii i Psikhiatrii (USSR) 1947, v. 16, no. 5, p. 56.

Descriptors: (*Frostbite, Reviews), (*Hypothermia, Pathology), (*Therapy, Frostbite), Body temperature, Freezing, Tissues (Biology), Tolerances (Physiology), Peripheral nervous system, Muscles, Necrosis, Exposure, USSR.

Two summaries of research on the pathological effects and clinical treatment of general and local hypothermia are presented. In the first report, certain aspects of cryopathological manifestations are considered in terms of their destructive potential in warm-blooded species. Experimental results and observations noted by various Soviet medical scientists are described. In the second report, the pathological processes involving the peripheral nervous system and muscles of fifty frostbite victims are briefly discussed.

AD-610 916 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
INFLUENCE OF HYPOXIA ON COLOR VISION,
by A. I. Yusfin, B. S. Frantsen, and G. N. Rautyan.
Mar 59, 7p T-324-R
TT 59-15992

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1953, v. 92, no. 6, p. 1153-1156.

Descriptors: (*Color vision, Hypoxia), (*Hypoxia, Color vision), Thresholds (Physiology), Visual perception, Visual acuity, Retina, Oxygen, High altitude, USSR.

The color vision of 25 normal subjects was tested by means of an anomaloscope at the ceiling altitude of 'ascents' of 5000 to 7000 m in a low-pressure chamber. The mean data show a decrease in acuity of color discriminations for all 3 receptor systems, especially the blue-sensing organism. The depression of discrimination becomes more marked with increasing altitude.

AD-610 929 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
CHANGES OF VASCULAR PERMEABILITY AND CAPILLARY STRENGTH ASSOCIATED WITH HEMORRHAGIC MANIFESTATIONS IN RABBITS AFTER EXPOSURE TO IONIZING RADIATION,
by N. I. Arlashchenko. Feb 61, 10p T-346-R
TT 61 22401

Unclassified report

Trans. of Meditsinskaya Radiologiya (USSR) 1959, v. 4, no. 4, p. 10-16.
Also available from NRC mi$0.50, ph$3.00 as C-3602.

Descriptors: (*Radiation effects, Blood vessels), (*Radiation sickness, Hemorrhage), Capillaries, Pathology, Radiation injuries, Intestines, Eye, Skin, Permeability, Lethal dosage, Rabbits, USSR.

The sharpest increase of vascular permeability following irradiation of rabbits (1,000 r) takes place in the first hours after the action of ionizing radiation. At this time there is seen a sharp increase in the quantity of intravenously injected fluorescine in the anterior chamber of the eye, as compared to normal conditions. The resistance of the capillaries of the rabbits' small intestine in relation to external pressure causing hemorrhages in the intestinal wall drops more markedly during the late stages of radiation sickness. The period of largest changes in vascular resistance coincides with the time of appearance of hemorrhages in the internal organs of the animal. (Author)

AD-610 932 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
PERCEPTION OF AN IMMOBILE RETINAL IMAGE,
by A. L. Yarbus. Mar 61, 4p T-352-R
TT 61-25404

Unclassified report

Trans. of Biofizika (USSR) 1956, v. 1, no. 5, p. 435-437.
Also available from NRC mi$1.00, ph$1.50 as C-3660, 3p.

Descriptors: (*Visual perception, Images), (*Retina, Visual perception), Color vision, Motion, Illumination, Vision, Afterimages, USSR.

CONCLUSIONS: An image, immobile on the retina of the eye, ceases to be perceived after a few seconds. Once it has disappeared, perception of the image does not again appear so long as the illumination and the position of the image on the retina remain unaltered.

AD-610 947 Div. 16,20
CFSTI Prices: HC$4.00 MF$0.75

USAF Radiation Lab., Univ. of Chicago, Ill.
THE EFFECTS OF IONIZING RADIATIONS ON THE BIOCHEMISTRY OF MAMMALIAN TISSUES.
Quarterly progress rept. no. 54.
15 Jan 65, 101p
Contract AF41 609 1693, Proj. 7757, Task 775702

Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.
See also AD-607 952.

Descriptors: (*Radiation effects, Tissues (Biology)), (*Tissues (Biology), Radiation effects)), (*Radioprotective agents, Biochemistry), X rays, Enzymes, Liver, Spleen, Rats, Toxicity, Organic phosphorus compounds, Adenosine phosphates, Radiation injuries, Lethal dosage, Whole body irradiation, Hemopoietic system, Gamma

rays, Fast neutrons, Hypoxia, Life span, Tolerances, (Physiology).

Contents: The effects of Ionizing Radiations on the Biochemistry of Mammalian Tissues: (1) Studies on the Effect of X-irradiation on Coenzyme A Levels of the Livers of Mice; (2) Influence of X-irradiation on the Development of a Detoxification System for Phosphorothioates in the Livers of Rats; Pharmacological or Toxicological Compounds as Protective or Therapeutic Agents Against Radiation Injury in Experimental Animals: (1) The Influence of Various Chemical Compounds on Radiation Lethality in Mice; (2) Dose-Mortality Relationships for Several Radioprotective Agents; (3) Studies on the Relationship Between Spleen Oxygen Tension and Radioprotection in Mice; (4) Effects of Acute and Chronic Exposure to Hyperbaric Oxygen on the Survival of Normal and X-irradiated Animals; The Influence of Low Levels of Gamma and Fast Neutron Irradiation on the Life Span of Animals: Application of Radiation-Induced Changes in Adenosine Triphosphatase Activity of Hematopoietic Tissues to a Study of Chronic Gamma Irradiation and the Influence of Various Factors on Acute Radiation Injury.

AD-610 973 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
ABSORPTION IN THE STOMACH,
by R. O. Faitel'berg. Jan 59, 17p T-299-R
TT 59-10991

Unclassified report

Trans. of Uspekhi Sovremennoi Biologii (USSR) 1950, v. 30, no. 3(6), p. 372-381.

Descriptors: (*Stomach, Absorption (Biological)), (*Absorption (Biological), Stomach), Gastrointestinal system, Membranes (Biology), Mucus, Water, Salts, Carbohydrates, Proteins, Fats, Alcohols, Acids, Dyes, Drugs, Nervous system, Endocrine glands, Animals, Humans, USSR, Reviews.

This review includes material on absorption of water, salts, carbohydrates, proteins, fats, alcohol, acids, dyes, and pharmaceutical substances. The role of the nervous system and of the endocrine flands as regulators is discussed. It is concluded that the absorptive action of the stomach is the result of direct activity on the part of the epithelial cells of the gastric mucosa.

AD-611 016 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE COSMOS AND THE FEELING OF SPACE,
by M. D. Emel'yanov. 2 Feb 65, 10p FTD-TT-64-897
TT 65-61675

Unclassified report

Unedited rough draft trans. of Zdorov'e (USSR) 1963, v. 9, no. 7, p. 2-3.

Descriptors: (*Space flight, Space medicine), (*Space medicine, Sensory mechanisms), (*Vestibular apparatus, Weightlessness), Space environmental conditions, Astronauts, Motion, Training, USSR.

AD-611 045 Div. 16
CFSTI Prices: HC$7.00 MF$1.75

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
PRIMARY AND INITIAL PROCESSES IN THE BIOLOGICAL EFFECTS OF RADIATION (SELECTED ARTICLES),
29 Jan 65, 366p FTD-TT-64-515
TT 65-61713

Unclassified report

Unedited rough draft trans. of mono. Pervichnye i Nachal'nye Protsessy Biologicheskogo Deistviya Radiatsii, Moscow, 1963, p. 1-44, 53-156, 192-201, 214-233, 243-270, 277-278.

Descriptors: (*Radiobiology, Symposia), (*Radiation effects, Cells (Biology)), Biochemistry, Bacteria, X rays, Bacteriophages, Proteins, Biosynthesis, Nucleoproteins, Tracer studies, Radioprotective agents, Metabolism, Phosphorus, Amino acids, Lipids, Desoxyribonucleic acids, Radiation injuries, Escherichia coli, Tissue culture cells, Reproduction (Physiology), Chromosomes, Enzymes, Yeasts, Nerves, Muscles, USSR.

The primary and initial cellular processes forming the basis of the biological effects of radiation are discussed in eighteen reports which were presented at an international symposium. The symposium was organized by the Academy of Sciences of the USSR, with the support of the Department of Natural Sciences of UNESCO and the International Atomic Energy Agency. The reports, including general discussions, deal with the primary effects of ionizing radiation on molecular, subcellular, and cellular levels. The same material is reportedly being published in English by the Academic Press.

AD-611 048 Div. 16, 30
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
RADIOREFLEXOMETER,
by O. Ya. Bokser and M. I. Klevtsov. 28 Jan 65, 6p FTD-TT-64-864
TT 65-61695

Unclassified report

Unedited rough draft trans. of Russian patent 159938, appl. no. 762014/31-16, 25 Jan 62.

Descriptors: (*Medical equipment, Electronic recording systems), Motor reactions, Nerve impulses, Verbal behavior, Muscles, Respiration, Measurement, Patents, USSR.

An improved radioflexometer for studying motor, respiratory, and verbal reactions is described. The instrument is designed to speed up the measurement of latent and open periods of the bioelectric component of conditional and unconditional reactions, as well as the difference between latent period of reaction and latent period of its bioelectric component, without preliminary measurement of the absolute values of these periods.

AD-611 052 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
GASTRIC MOTILITY AT LIQUID DIET,
by P. G. Bogach and S. D. Groisman. 28 Jan 65, 14p FTD-TT-64-873
TT 65-61699

Unclassified report

Unedited rough draft trans. of Fiziologicheskii Zhurnal

SSSR, 1964, v. 50, no. 2, p. 193-198.

Descriptors: (*Gastrointestinal system, Motion), (*Digestive system, Liquids), Stomach, Diet, Dogs, USSR.

Research was conducted to determine whether gastric peristalsis originates during the feeding of dogs with a liquid diet. Results showed that peristalsis does not effect evacuation of liquid from the stomach. Stomach liquids are evacuated under the effect of tonic contraction of gastric walls, but peristalsis in a stomach filled with liquid always occurs.

AD-611 053 Div. 16, 12
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE SENSATION OF EARTH,
by V. S. Farel'. 2 Feb 65, 11p FTD-TT-64-896
TT 65-61700
Unclassified report

Unedited rough draft trans. of Zdorov'e (USSR) 1963, v. 9, no. 5, p. 4-5.

Descriptors: (*Sensory perception, Adaptation (Physiology)), (*Weightlessness, Adaptation (Physiology)), Space environmental conditions, Stability, USSR, Astronauts.

Russian article, intended for popular reading, concerning the sensations experienced by those traveling in space, especially weightlessness.

AD-611 130 Div. 16
CFSTI Prices: HC$2.00 MF$0.50

American Biophysics Research Lab., Lansdale, Pa.
GENERAL BIOPHYSICAL INVESTIGATIONS.
Final rept.,
by Alvin Singer and Charles Reinhardt, Jr.
Dec 64, 42p
Contract Nonr418000
Unclassified report

Descriptors: (*Medical equipment, Microminiaturization (Electronics)), (*Cannulation, Miniature electronic equipment), Medical examination, Physiology, Transducers, Electrodes, Flowmeters, Fiber optics, Blood pressure, Respiration, Electrocardiography, Body temperature, Animals, Oxygen, Carbon dioxide, Phosphorus, Dioxides.

An Intravascular Ultrasonic Blood Flow Catheter consisting of two electro-ceramic transducers mounted on a no. 9 French catheter was evaluated in vitro. Only extremely high or interrupted flow rates were detectable because of extraneous noise in the associated electronics. An Intravascular Oxygen Microelectrode Catheter consisting of a membrane covered oxygen electrode mounted on a no. 7 French catheter was evaluated in vitro and in vivo. The study showed that the use of these devices will eliminate the need for withdrawing discrete blood samples from the system while providing a continuous record of PO2 and pCO2 changes. An Intravascular Fiber Optics Pressure Transducer Catheter consisting of a miniature photostress pressure transducer and a fiber optical system mounted on a no. 9 French catheter was evaluated in vitro and in vivo. Its superiority over other methods currently available for flood pressure measurement has definitely been established. A hyperbaric physiological chamber was instrumented for obtaining EKG, respiration rate, temperature and blood pressure. The chamber was used for in vivo hyperbaric evaluations conducted with animals during this study. (Author)

AD-611 148 Div. 16, 23
CFSTI Prices: HC$1.00 MF$0.50

Navy Experimental Diving Unit, U. S. Naval Station, Washington, D. C.
OXYGEN CONSUMPTION IN UNDERWATER SWIMMING,
by W. K. Wilson. 1 Sep 53, 8p RR-LR-15,53, 3-63
Unclassified report

Descriptors: (*Oxygen consumption, Swimming), (*Swimming, Underwater), Diving, Breathing, Scuba divers, Naval personnel, Velocity, Carbon dioxide, Toxicity.

The principal objectives of the study were to obtain physiological data and to quantitate the relative efficiency of underwater demolition team swimmers and Experimental Diving Unit personnel who had participated in evaluations of breathing apparatus. Numerical results are presented in tabular and graphic form. Speeds below 0.7 knots were uncomfortably slow, and the ability to control depth by 'planking' was largely lost. While the 'good' swimmers were able to maintain a speed of 1.0 knots for a significant time, the majority considered it uncomfortably fast. Speeds in excess of 1.0 knots were maintained with difficulty. Some subjects were able to swim at those speeds barely long enough to permit adequate measurements. Subjects were generally agreed that 0.8 knots was the most suitable speed for prolonged swimming and felt that they could maintain this almost indefinitely. Limitations of the breathing apparatus contributed to the difficulty in maintaining higher speeds. Symptoms of carbon dioxide toxicity appeared in some subjects at 1.0 knots before the size of the absorption canisters was increased, and 'breathing resistance' was not an infrequent complaint. There were also indications that 'drag,' influenced by the contours of the apparatus, became an important factor at high speeds.

AD-611 179 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Harvard Coll., Cambridge, Mass. President and Fellows.
HYPOTHALAMIC SECRETORY FACTOR FOR ADRENOCORTICOTROPIC HORMONE (SF-ACTH).
Final technical rept. for 15 Aug 63-14 Aug 64,
by Paul L. Munson. 15 Jan 65, 4p
Grant AF AFOSR405 63
AFOSR 65-0286
Unclassified report

Descriptors: (*Adrenocorticotropic hormones, Secretion), Biosynthesis, Thalamus, Tissue extracts, Hormones, Purification, Stress (Physiology), Biological assay, Inhibition, Pituitary gland, Barbiturates, Anesthesia, Ascorbic acid, Toxicity, Rats.

The purpose of this research is to purify the hypothalamic hormone responsible for the increased biosynthesis and secretion of ACTH in stress. This hormone, originally named 'corticotropin releasing factor (CRF)' by Dr. Murray Saffran of McGill University, is now referred to as 'hypothalamic secretory factor for ACTH (HSF-ACTH)'. Because the only feasible guide to yield and specific activity of HSF-ACTH is a rather complicated biological assay system, the studies have included ways to improve and simplify the biological assay for the hypothalamic secretory factor for ACTH are based on a discovery that in the rat anesthetized with pentobarbital, morphine inhibits ACTH secretion to nonspecific stimuli without interfering with the action of HSF-ACTH on the anterior pituitary gland.

AD-611 183 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Weizmann Inst. Rehovoth (Israel).
BIOLOGICAL SIGNIFICANCE OF HIGH MOLECULAR WEIGHT POLYPEPTIDES.
Final technical rept. for 1 Jul 63-30 Jun 64,
by Ephraim Katchalski. 30 Jun 64, 23p
Grant AF EOAR63 59
AFOSR 65-0281

Unclassified report

Descriptors: (*Proteins, Biochemistry), (*Amino acids, Biochemistry), (*Enzymes, Solubility), Polymers, Escherichia coli, Growth, Nutrition, Molecular weight, Peptides, Bacteria, Trypsin, Coliphage, Hydrolysis, Colloids, Cells (Biology), Blood coagulation, Desoxyribonucleic acids, Viruses, Membranes (Biology), Permeability, Tracer studies.

Summaries of research conducted on the following three topics are presented: (1) Use of polyamino acids in the study of cell membranes; (2) interaction of polyamino acids with viruses; (3) preparation and characterization of water-insoluble enzyme derivatives.

AD-611 185 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Western Reserve Univ., Cleveland, Ohio.
VASO-PRESSIN BIOSYNTHESIS.
Final scientific rept. for Feb 63-Oct 64,
by H. Sachs. Oct 64, 3p
Grant AF AFOSR408 63
AFOSR 65-0282

Unclassified report

Descriptors: (*Pituitary hormones, Biosynthesis), Secretion, Thalamus, Tissues (Biology), Radioactive isotopes, Labeled substances, Tracer studies, Nerve cells, Tyrosine, Amino acids, Proteins, Dehydration, Enzymes.

The objectives of the research were to study in vivo and in vitro a number of processes concerned with the biosynthesis, storage, and release of vasopressin. Previous experimental data suggested the possibility that the biosynthesis of vasopressin occurs in a bound, biologically inactive form and that the release of hormone takes place during the formation and maturation of the neurosecretory particles. Data have now been obtained which are consistent with such a 'precursor model' for vasopressin biosynthesis. The in vitro systems, capable of carying out the biosynthesis and release of vasopressin, offer a considerable number of possibilities for studies concerned with the neurosecretory process.

AD-611 221 Div. 16, 3
CFSTI Prices: HC$3.00 MF$0.75

Lever Brothers Co., Edgewater, N. J.
BASIC STUDIES IN PERCUTANEOUS ABSORPTION.
Semi-annual rept. no. 8, Jul-Dec 64,
ed by Leonard J. Vinson, Thomas Masurat, and Edward J. Singer. Dec 64, 99p
Contract DA18 108CML6573

Unclassified report

Limited number of copies containing color other than black and white are available until stock is exhausted. Reproductions will be made in black and white only.
See also AD-606 878.

Descriptors: (*Skin, Absorption), (*Organic solvents, Penetration), (*Lipids, Permeability), Integumentary system, Electrical conductance, Solvent extraction, Tissues (Biology), Membranes (Biology), Histological techniques, Proteins, Enzymes, Amines, Water, Diffusion.

Studies on the effect of organic solvents on the permeability properties of stratum corneum membranes were expanded to include the effect of sequential solvent treatments. Alterations in barrier and water-binding properties induced by differential extractions were measured and the extracts obtained analyzed in order to characterize the critical components of the corneum. In view of the probable importance of lipid-protein complexes in providing an intact skin barrier, the protein components associated with the keratinization process are being investigated. Studies on the electrodialysis of amines through stratum corneum membranes are reported, and the interaction with the barrier structure of the charged forms of the amines and the free bases is discussed. A critical comparison was made of the water diffusion rate through skin and its electrical conductivity. The results presented show a high degree of correlation, thereby demonstrating that conductivity is an excellent indicator of barrier integrity. An interesting modification of the Papanicoloau stain was developed making it possible to differentiate the various degrees of keratinization in both rat and human stratum corneum.

AD-611 226 Div. 16, 20
CFSTI Prices: HC$1.00 MF$0.50

Naval Radiological Defense Lab., San Francisco, Calif.
BACTERIOLOGICAL STUDIES ON ANIMALS EXPOSED TO NEUTRON RADIATION,
by Myron S. Silverman and Victor P. Bond.
Jul 53, 15p
Proj. 23.2
WT 794

Unclassified report

Rept. on Operation Upshot-Knothole, Nevada Proving Grounds, Mar-Jun 53.

Descriptors: (*Animals, Radiation effects), (*Radiation effects, Nuclear explosions), (*Bacteria, Radiation effects), (*Radiation injuries, Animals), Lethal dosage, Neutrons, Gamma rays, Heart, Blood, Spleen, Pathology.
Mice exposed to supralethal doses of neutron radiation and combined neutron and gamma radiation from the nuclear device used in Upshot-Knothole 9 (May 8, 1953) died within 21/2 to 4 days. Bacteriological examination of the heart blood and spleen from animals sacrificed while moribund revealed that 78 per cent of the animals receiving only neutron radiation and 96 per cent of the animals receiving combined neutron and gamma radiation suffered an extensive invasion by the normal intestinal bacteria. Contrary to findings reported elsewhere on animals exposed to x rays, invasion by two or more species of bacteria was found to be a common occurrence. In a large number of animals examined, positive cultures were obtained only from the spleen. This is interpreted as indicating that, although the filtering mechanism of the spleedn still functioned, this organ was unable to destroy the invading bacteria either because of the overwhelming number of bacteria or because of the injury to the spleen itself. Hence the organisms continued to multiply and eventually spilled back into the circulatory system.

AD-611 247 Div. 16
CFSTI Prices: HC$2.00 MF$0.50

School of Aerospace Medicine, Brooks AFB, Tex.

BIOLOGICAL EFFECTS OF NUCLEAR RADIATION ON THE MONKEY (MACACA MULATTA): TWO-YEAR EVALUATION,
by J. E. Pickering, D. B. Williams, G. S. Melville, Jr., A. A. McDowell, and T. P. Leffingwell. Jun 59, 50p
Proj. 39 6 suppl 1
WT 1542

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Nuclear explosions, Radiation effects), (*Radiation effects, Monkeys), Neutrons, Gamma rays, Hematology, Erythrocytes, Leukocytes, Lymphocytes, Hematocrit, Blood platelets, Anemias, Blood diseases, Hemoglobin, Thresholds (Physiology), Radiological dosage, Behavior, Learning, Visual acuity, Auditory perception.

Macaca mulatta monkeys were exposed to prompt neutron and gamma radiation from two nuclear detonations. At a period roughly two years postirradiation, the survivors were examined with respect to long-term effects on clinical appearance, peripheral hematology, behavior, and cataractogenesis. Recovery of erythroid indices in shot Wilson survivors was (1) functionally complete by about 9 weeks postexposure, (2) effected by production of larger hyperchromic erythrocytes with a normal hemoglobin concentration, and (3) followed by a possible macrocytic hyperchromic anemia for the majority of the 63- to 540-day postexposure period. Lymphocytes of the myeloid series were the last to evidence recovery; the single animal that died exhibited a unique lymphocytic hypoplasia, which suggests a differential effect on the precursor tissue. The results with respect to behavior parameters include (1) differences on preliminary Wisconsin General Test Apparatus training which support the hypothesis of a radiation-induced elevation of response threshold values, (2) learning-performance differences in the male radiation dosage groups which are in accord with previous researches on other groups of monkeys, (3) observed differences between male and female monkeys on both learning performance and free-cage behavior parameters, and (4) a radiation-induced facilitation on difficult size discrimination problems.

AD-611 256 Div. 16, 20
CFSTI Prices: HC$3.00 MF$0.75

California Univ., Los Angeles. Lab of Nuclear Medicine and Radiation Biology.
FACTORS INFLUENCING THE BIOLOGICAL FATE AND PERSISTENCE OF RADIOACTIVE FALL-OUT,
by R. G. Lindberg, E. M. Romney, J. H. Olafson, and K. H. Larson. Jan 59, 78p
Proj. 37 1
WT 1177

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.

Descriptors: (*Radioactive fallout, Biological contamination), (*Biological contamination, Radioactive fallout), Plants (Botany), Animals, Grasses, Soils, Fission products, Radiation effects, Gastrointestinal system, Tissues (Biology), Beta decay, Nuclear explosion damage.

A study was made of the biological fate and persistence of radioactive fall-out relative to the physical characteristics of fall-out contamination, which varied with distance from Ground Zero (GZ). Special attention was given to the type of fall-out contamination on forage plants as representative of the internal emitters available to animals grazing in fall-out-contaminated areas. Data indicated that the activity associated with the plant samples collected from areas within the various fall-out patterns was predominantly the result of external contamination by radioactive fall-out particles less than 44 microns in diameter. The tissue burdens of mixed fission products in animals sampled from fall-out-contaminated environments tended to decrease with distance from GZ in a manner similar to the degree of plant contamination. The relative decrease of total beta radiation in tissues of native animals serially sampled from the same fall-out-contaminated environment in most cases did not markedly deviate from the theoretical beta radioactive decay rate of mixed fission products. In all cases, animals with high activity in the gastrointestinal contents also had relatively high tissue burdens, whereas animals with low activity in the gastrointestinal tract had low tissue burdens.

AD-611 264 Div. 16, 20
CFSTI Prices: HC$1.00 MF$0.50

Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
THE INTERNAL ENVIRONMENT OF UNDERGROUND STRUCTURES SUBJECTED TO NUCLEAR BLAST. II. EFFECTS ON MICE LOCATED IN HEAVY CONCRETE SHELTERS,
by D. R. Richmond, C. S. White, R. T. Sanchez, and F. Sherping. Sep 59, 25p
Proj. 33 6
WT 1507

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Radiation effects, Mice), (*Nuclear explosions, Radiation effects), (*Underground structures, Radiation hazards), Shelters, Gamma rays, Sublethal dosage, Pathology, Diseases, Salmonella.

A cage containing 20 mice was placed in each of 12 underground shelters tested on shot Smoky in an attempt to assess biologically the inside environment of the shelters. Two samples of 20 mice each acted as controls. The structures, of French and German design, were located at ranges between 840 ft and 4320 ft from Ground Zero. Shot Smoky, a nuclear device, was exploded atop a 700-ft tower and had a yield of 43 kt. All but one group of mice were recovered on D + 2 days. Aside from two samples placed in unrealistic locations, all animals were alive at recovery. With one exception, the peak pressures in the chambers that contained mice were insignificant, ranging from a fraction of 1 psi to 1.6 psi. The one high pressure of 14.4 psi did not kill any of the mice. According to the film-badge dosimeters, one group of mice received 190 r of gamma radiation. The others were exposed to 54 r of gamma or less. The mice were observed for a 60-day postshot period. The deaths that occurred were attributed to a Salmonella infection in the animal colony and not to radiation. Although the gamma radiation doses that most of the animal groups received were low, the levels that existed in the main chambers near the entry doors of the German shelters were over 100 r, a biologically significant dose. In contrast, the environment within two of the French shelters appeared to be quite acceptable. (Author)

AD-611 281 Div. 16
CFSTI Prices: HC$2.00 MF$0.50

Washington Univ., Seattle.

ON THE TRANSFER FUNCTION OF HUMAN SKIN.
Final rept.,
by Konrad J. K. Buettner. 1965, 28p
Contract DA18 108 405CML666

Unclassified report

Descriptors: (*Skin, Penetration), (*Perspiration, Skin), (*Absorption (Biological Skin), Water vapor, Sweat glands, Secretion, Sorption, Water, Humidity, Moisture, Air, Feet, Diseases, Test methods.

Different aspects of transfer through human skin are clarified. Water and water vapor are believed to move through intact skin surface by: (a) glandular secretion such as that of sweat glands, (b) sorption and desorption in the horny layer, (c) diffusion through the horny layer. With proper care all three avenues can be sufficiently well differentiated. Sweating can be partly controlled by low room temperature, atropine and selection of a body area not prone to sweating. Sweat amount is also measured in blank tests on the opposite limb, furthermore by counting sweat droplets. Horny layer sorption and desorption is a saturation process after the skin enters a new environment. After sweat and sorption are evaluated or prevented, there remains a flow of liquid water or vapor through the skin which seems to depend on the water concentration of the medium touching the skin. This concentration will be defined for water solutions, as well as for air, as relative humidity r sub a. In all but a very few test persons water and water vapor, from solutions or air, of more than r sub a 90 per cent, pass into the skin. Since the point of no transfer of 90 per cent relative humidity or about four osmolarity, the transfer should be active.

AD-611 292 Div. 16

Oxford Univ. (England)
ISOCITRATASE AS AN ENZYMIC INDICATOR OF METABOLIC PATHWAYS,
by H. L. Kornberg. 1960, 3p
Contract AF61 052 180
AFOSR 250

Unclassified report

Pub. in Nature (Gt. Brit.) v188 n4749 p488-89 Nov 5 1960 (Copies available only to DDC users).

Descriptors: (*Metabolism, Biochemistry), (*Enzymes, Chemical indicators), Microorganisms, Degradation, Citrates, Acetates, Amino acids, Proteins, Tissues (Biology), Pseudomonas, Oxidation, Great Britain.

Pseudomonas ovalis Chester organisms were grown on media containing respectively lysine, or the sodium salts of glutaric, acetone dicarboxylic, acetoacetic, acetic, alpha-hydroxy-glutaric, beta-ketoglutaric and glutamic acids as sole sources of carbon. The isocitratase activity of extracts of cells thus grown was measured. Growth on the first five carbon sources (lysine and the substrates of path A) was accompanied by high and uniform levels of isocitratase, which indicates that their catabolism led chiefly to acetate. Growth on the last three substrates (the substrates of path B) led to formation of only traces of the enzyme.

AD-611 296 Div. 16

Karolinska Inst., Stockholm (Sweden).
EFFECT OF RESERPINE ON THE RELEASE OF CATECHOLAMINES FROM ISOLATED NERVE AND CHROMAFFIN CELL GRANULES,
by U. S. v. Euler and F. Lishajko. 27 Jan 61, 9p
AFOSR 2338

Unclassified report

Pub. in Acta Physiologica Scandinavica (Sweden) v52 p137-45 1961 (copies available only to DDC users). Research partly supported by the Swedish Medical Research Council.

Descriptors: (*Reserpine, Pharmacology), (*Levarterenol, Inhibition), Nerve cells, Chemoreceptors, Epinephrine, Enzymes, Amines, Sweden.

In a suspension of bovine splenic nerve granules, reserpine in concentrations of 10 to the minus 8th power to 10 to the minus 5th power M strongly inhibits the spontaneous release of noradrenaline. The catecholamine releasing action of tyramine on nerve granules is unaffected by low concentrations of reserpine, but is almost completely blocked by concentrations of 10 to the minus 5th power M. Reserpine is less active as inhibitor on suprarenal medullary granules from the rabbit and still less on cats' medullary granules. The spontaneous release occurs at a lower rate in rabbit's medullary granules than in those from the cat. No difference in the rate of release was found between adrenaline and noradrenaline from the cat's medullary granules. After administration of dopa 100 mg/kg i.v. in the rabbit the rate of release from the medullary granules was greatly enhanced. The possible action of reserpine as enzyme inhibitor is briefly discussed. (Author)

AD-611 297 Div. 16, 4

Karolinska Inst. Stockholm (Sweden).
OCCURENCE AND DISTRIBUTION OF CATECHOLAMINES IN THE FISH BRAIN,
by U. S. von Euler. 24 Jan 61, 4p
Contract AF61 052 309
AFOSR 2337

Unclassified report

Pub. in Acta Physiologica Scandinavica (Sweden)v52 p62-64 1961 (Copies available only to DDC users).

Descriptors: (*Epinephrine, Brain), (*Levarterenol, Brain), (*Brain, Amines), (*Fishes, Brain), Tissues (Biology), Nerve fibers, Thalamus, Distribution, Sweden.

Relatively high amounts of catecholamines were found in the brains of an elasmobranch, Squalus acanthias and a teleost, Gadus callarias. Only small quantities could be demonstrated in the brain of a cyclostome, Myxine glutinosa. Both adrenaline and noradrenaline occurred in the brains of Squalus and of Gadus although noradrenaline was predominant. A characteristic distribution of the catecholamines in the brain of Squalus was observed. The highest amount of noradrenaline was found in the diencephalon, hypothalamus, and hypophysis, while the crebellum contained only very small quantities. (Author)

AD-611 302 Div. 16

London Univ. (England).
ECHO-LOCATION IN BATS,
by F. C. Ormerod and J. D. Pye. 1960, 7p
Contract AF61 052 271
AFOSR 1263

Unclassified report

Pub. in Acta Oto-Laryngologica (Sweden) v53 p196-201 1961 (Copies available only to DDC users).

Descriptors: (*Bats, Echo ranging), Sensory mechanisms, Anatomy, Physiology, Great Britain.

AD-611 303 Div. 16

Milan Univ. (Italy).

VARIABILITY OF SOME CHARACTERISTIC ELEMENTARY FUNCTIONS OF THE CENTRAL NERVOUS SYSTEM OBSERVED IN MAN (Variabilita di Alcuni Caratteri Funzionali Elementari del Sistema Nervoso Centrale Rilevati nell'Uomo),
by Livia Gallitelli and Torquato Gualtierotti.
Jan 59, 4p
Contract AF61 052 23
AFOSR TN-59-655

Unclassified report

Pub. in Accademia Nazionale dei Lincei. Classe di Scienze Fisiche, Matematiche e Naturali. Rendiconti (Italy) ser8 v26 p83-6 Jan 1959 (copies available only to DDC users).
Document in Italian.

Descriptors: (*Central nervous system, Physiology), Humans, Stimulation, Nerve fibers, Nerve impulses, Inhibition, Italy.

AD-611 317 Div. 16, 20
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Los Angeles, School of Medicine.
BETA SKIN-DOSE MEASUREMENTS BY SPECIALLY DESIGNED FILM-PACK DOSIMETERS,
by Richard K. Dickey, Louis B. Silverman, and Mary Lee Griswold. May 57, 26p
Proj. 37 2
WT 1178A

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.

Descriptors: (*Skin, Dosimeters), (*Dosimeters, Photographic film), (*Radioactive fallout, Skin), Dose rate, Beta particles, Fission products, Radiological contamination, Photographic processing equipment, Tables, Nuclear explosions.

A film dosimetric method for determining the beta-ray dose received directly below the cornified epithelial surface of the skin (7 mg/cm squared) from exposure to fall-out fission products was used during Operation Teapot. The design and construction of the special film pack required and the method of reading and interpreting the films are discussed. Nine or ten packs were used for each of the four shots of interest to Project 37.2, March 7 (Turk), March 29 (Apple I), April 15 (Met), and May 5 (Apple II). Each pack was exposed only once. In the case of the first two shots, no fall-out occurred at the pack stations selected. The results obtained from film packs exposed on Met and Apple II indicated that the maximum individual fall-out particle skin dose varied from >3000 rep beta at 7 miles from Ground Zero to 470 rep beta at the 140-mile arc. Tables are included which summarize the exposure conditions and results for all the film packs. (Author)

AD-611 319 Div. 16, 18, 20
CFSTI Prices: HC$6.00 MF$1.25

Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
BIOLOGICAL EFFECTS OF PRESSURE PHENOMENA OCCURRING INSIDE PROTECTIVE SHELTERS FOLLOWING A NUCLEAR DETONATION,
by C. S. White, T. L. Chiffelle, D. R. Richmond, W. H. Lockyear, and I. G. Bowen. Oct 56, 216p
Proj. 33 1
WT 1179

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.

Descriptors: (*Explosion effects, Animals), (*Blast, Nuclear explosion damage), Pressure, Shelters, Underground structures, Reinforcing materials, Pathology, Radiography, Electrocardiography, Histological techniques, Photographs, Tables.

In two series of experiments 277 experimental animals were exposed under selected conditions in six different general types of instrumented above- and below-ground shelters to blast produced by nuclear explosions. The distance of the several structures from Ground Zero ranged from 1050 to 5500 ft. The most severe alterations in the pressure environment occurring inside the structures followed the detonation of a nuclear device with a yield approximately 50 per cent greater than nominal. The highest overpressure to which animals were exposed was 85.8 psi, the rise time of which was 4 msec. Following the nuclear explosions, all animals were recovered, examined, sacrified, and subjected to gross and microscopic pathological study. All lesions were tabulated and described. The results of pressure-time data, documenting the variations on the pressure environment, are presented and analyzed, and an exploratory attempt is made to relate the alterations in the pressure environment to the associated pathology observed. A critical review of selected material from the blast and related literature is presented.

AD-611 322 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Navy Experimental Diving Unit, U. S. Naval Station, Washington, D. C.
OXYGEN DECOMPRESSION FOLLOWING AIR DIVES FOR USE IN HYPERBARIC OXYGEN THERAPY,
by R. D. Workman. 15 Dec 64, 16p
Research rept. RR-2-64
Proj. F011 06 01, Task 3361

Unclassified report

Descriptors: (*Diving, Life support), (*Decompression sickness, Therapy), Oxygen, Barometric pressure, Nitrogen, Tissues (Biology), Toxicity, Air, Simulation.

Two decompression schedules with use of oxygen were tested to provide for 3 and 4 hour air exposures at 3 atmospheres absolute pressure required for use in hyperbaric oxygen treatment. Schedules for such long exposures have not been available previously to permit use of oxygen breathing that decompression time be shortened. Six subjects were exposed to air breathing in a dry pressure chamber at 70 feet equivalent depth in sea water for periods of 180 and 240 minutes, respectively. Decompression was carried out with oxygen breathing at 30, 20, and 10 foot stops. All six subjects exposed for 180 minutes were symptom-free following decompression. Of six subjects exposed for 240 minutes, one subject developed transient vertigo one hour post dive, which resolved promptly with oxygen breathing at a depth of 60 feet. Greater than average susceptibility to decompression sickness from such prolonged exposures in this subject is considered to be a severe test of adequacy for this schedule. Thus, the schedules tested should provide efficient decompression for these prolonged exposures with minimal risk of symptoms of decompression sickness. No manifestations of oxygen toxicity appeared during the oxygen decompression periods. (Author)

AD-611 323 Div. 16, 2, 20
CFSTI Prices: HC$2.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.
DOSIMETRIC EVALUATION OF THE ALPHA FLUX IN SOLAR PARTICLE BEAMS.

Rept. no. 30,
by Hermann J. Schaefer. 30 Nov 64, 27p
Rept. no. NSAM-912
Proj. MR005 13 1002, Task 1
Unclassified report

Joint rept. with the National Aeronautics and Space Administration, Washington, D. C.

Descriptors: (*Space flight, Radiation hazards), (*Alpha particles, Dosage), (*Solar flares, Alpha particles), Proton beams, Dose rate, Dosimeters, Shielding, Spacecraft, Space biology.

Depth distributions of absorbed doses and dose equivalents in tissue are computed for the alpha and proton components of a typical rigidity spectrum of a large flare assuming a flux ratio of one to one. Even for the lowest investigated shield thickness of 1.75 g/sq cm the total alpha dose is smaller than the proton dose and becomes even smaller with depth. The fractional high linear energy transfer alpha dose, however, is substantially larger than the corresponding proton dose and intersects the latter at 12 g/sq cm depth in tissue. In spite of this, the combined mean local relative biological effectiveness of the total dose is predominantly determined by the protons. The findings indicate that the alpha component of flare beams creates a significant additional exposure only for cases of very low shielding, such as an astronaut outside the vehicle protected merely by the space suit. (Author)

AD-611 342 Div. 16

California Academy of Sciences, San Francisco.
DOES THE BOBOLINK NAVIGATE.
by William J. Hamilton, III. 11p
Contract AF49 638 825
AFOSR 2517
Unclassified report

Pub. in Wilson Bulletin (U. S.) v74 n4 p357-66 Dec 31 1962.
Copies not available to DDC or Clearinghouse customers.

Descriptors: (*Birds, Navigation), Direction finding, Celestial navigation.

On 1 September 1959, a captive adult female Bobolink escaped from captivity at Berkeley, California. This bird had been taken from its breeding locality in North Dakota on 9 August 1959 and shipped to Berkeley where it was held on a light-dark schedule coinciding with the natural photoperiod for its home locality in North Dakota. On the three nights prior to escape this bird was held in an experimental cage automatically registering the directional component of migratory activity at night. On the first of these nights the preferred direction almost coincided with the home direction while on the third the direction was parallel to the natural route of migration of the population from which this bird was derived. The direction on the second night was intermediate. On the first day of June of the following year this same bird was recaptured at the location where it was originally trapped in Kenmare, North Dakota. Since the experimental site in California is not on a migratory pathway of Bobolinks, some navigation capacity permitting the eventual return seems to be implied. The orientation mechanism and the possible travels of this bird prior to recapture are discussed.

AD-611 359 Div. 16
CFSTI Prices: HC$6.00 MF$1.25

West Virginia Univ., Morgantown.

INFLUENCE OF IONIZING RADIATION ON THE PHYSIOLOGY OF SPORES OF CLOSTRIDIUM BOTULINUM.
Rept. no. 4 (Final) 28 Dec 59-28 Jan 63,
by S. J. Deal and Gwendolyn Stewart. 28 Jan 63, 217p
Contracts DA19 129qm1521, DA19 129qm1955,
Proj. 7 84 01 002
DSSC S-597 Unclassified report

Descriptors: (*Clostridium botulinum, Spores), (*Spores, Radiation effects), Ionization, Gamma rays, Microbiology, Growth, Morphology (Biology), Culture media, Electron microscopy, Nucleic acids, Enzymes, Dyes.

A method for producing, harvesting, and cleaning large numbers of spores of Cl. botulinum 62A is presented. The method enables the rapid and easy microscopic determination of physiological age. Germination studies were conducted by the use of both chemical and physical agents. Chemical agents included metabolites and non-metabolites. Physical agents were high level gamma irradiation and sonication with superbrite glass bead. The criterion of germination was the loss of dye refractility as determined by the uptake of dilute methylene blue. From a study of these specimens it appeared that a structure arose from the cytoplasmic membrane, migrated to the longitudinal axis of the cell, and established a synthetic site for spore components. The core was synthesized first, then surrounded sequentially by the inner transparent zone, the outer dense zone, and the exosporium. The participation of the cytoplasmic membrane in establishing an active synthetic site for sporulation became evident; however, elucidation of its role in subsequent stages of the process will require investigation by techniques which give greater specificity in the electron image. (Author)

AD-611 360 Div. 16
CFSTI Prices: HC$3.00 MF$0.50

Army Tropical Research Medical Lab., New York (APO 851).
A NUTRITION SURVEY OF THREE RURAL PUERTO RICAN COMMUNITIES,
by Irvin C. Plough, Nelson A. Fernandez-Lopez, Charles R. Angel, and Lydia J. Roberts. Dec 63, 52p
Unclassified report

Pub. in Asociacion Medica de Puerto-Rico. Boletin. v55 no. 12A (Suppl.) p1-51 Dec 1963.

Descriptors: (*Nutrition, Puerto Rico), (*Puerto Rico, Nutrition), (*Public health, Puerto Rico), Diet, Rural areas, Children, Adults, Medical examination, Pathology, Anemias, Growth, Parasitic diseases, Blood chemistry, Tables.

The dietary studies revealed less than optimal intakes of calcium, vitamin A and riboflavin, and perhaps other nutrients. The deficiets were most marked in children from three to ten years of age, and in adult women. The intakes of sulfur amino acids were below the minimum requirement in children under two. The only significant clincial finding was retardation of growth, most marked in pre-school children and children of early school age. Laboratory findings of hypoalbuminemia in children and of low excretion rates of riboflavin at all ages supported the dietary findings. Blood levels of vitamins A and C tended to be quite high. An unexpected finding was that the excretion rates of thiamine were rather low, although the intakes were calculated to be satisfactory. The finding may be explained by losses during cooking of thiamine added to rice in the enrichment process. Hypochromic anemia of moderate degree was common in women and children. Intestinal infestation with helminth parasites was highly prevalent, but rarely severe. (Author)

AD-611 370 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Pisa Univ. (Italy).
VISUAL SYSTEM AND SLEEP,
by G. Moruzzi. 1959, 15p
Contract AF61 052 107
AFOSR TN-60-1277 Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
Copy is available for public sale.

Descriptors: (*Sleep, Electroencephalography), (*Vision, Adaptation (Physiology), Retina, Stimulation, Cerebral cortex, Brain, Nervous system, Sensory mechanisms, Physiology, Italy.

The results of three groups of experiments on the relationships between the visual system and sleep in the midpontine pretrigeminal cat are summarized. The dark discharge of the retina exerts a tonic activating influence on the EEG, possibly by increasing the activity of the ascending reticular system. Reversible patterns of EEG synchronization occur following functional (ischemic) retinal deafferentation, in the dark adapted animal. In given experimental conditions continuous photic stimulation may produce EEG synchronization. Indirect evidence is given in support of the hypothesis that the abolition of the dark discharge is responsible for these effects. EEG sleep patterns occur only after several hours of repetitive photic stimulation. The mechanism of this EEG synchronizing effect is discussed. (Author)

AD-611 394 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Naval School of Aviation Medicine, Pensacola, Fla.
REVIEW OF MOTION SICKNESS DRUGS FROM 1954-1964,
by Charles D. Wood. 10 Dec 64, 14p
Special rept. no. SP-64-2
Unclassified report

Descriptors: (*Motion sickness, Drugs), (*Drugs, Motion sickness), Scopolamine, Antihistaminics, Parasympatholytic agents, Tranquilizers, Pharmacology, Reviews.

The Problem: The great increase in air and sea travel has resulted in a greater need for effective antimotion sickness drugs, and the exploration of space is expected to intensify this need. Since a review of available antimotion sickness drugs has not been published since 1955, a compilation of the newer drugs and studies reported in the last ten years is presented. Findings: Hyoscine (Scopolamine) still appears to be one of our most effective antimotion sickness drugs. Its severe side effects of drowsiness, vertigo, and dry mouth limit its usefulness. Meclizine (Bonamine) and Cyclizine (Marezine) are reported to be the most effective of the antihistamines. Their side effects are milder than most other preparations, and their level of reported effectiveness approaches that of hyoscine. (Author)

AD-611 401 Div. 16

Aerospace Research Labs., Office of Aerospace Research, Wright-Patterson AFB, Ohio.
THE THRESHOLD OF VISUAL SENSATION IN COMPARISON WITH THAT OF PHOTODETECTORS, ITS QUANTUM ASPECT, PROBLEMS OF COLOR PERCEPTION, AND RELATED SUBJECTS,
by Radames K. H. Gebel. Apr 64, 76p
Unclassified report

Order from Superintendent of Documents, GPO, Washington, D. C., 20402, $1.75, as D301.69/5:V82, Book no. 1964-0-740-079.

Descriptors: (*Vision, Biophysics), Color vision, Thresholds (Physiology), Eye, Photosensitivity (Biology), Statistical data, Quantum mechanics, Optics, Optical equipment, Optical images, Photocathodes, Blackbody radiation, Tables.

In this book the threshold of the human eye is investigated from a statistical point of view, and the effective spectral quantum efficiency of the eye is compared with that of technical devices employing opto-electronic photoemissive image detection by the present state of the art. Conventional light flux and energy units are converted into dimensions directly expressing the number of quanta involved, thus providing an easier comprehension of the statistical problems and limitations.

AD-611 435 Div. 16
CFSTI Prices: HC$3.00 MF$0.75

National Academy of Sciences-National Research Council, Washington, D. C.
PROCEEDINGS: WORKSHOP ON TERMITE RESEARCH, PURDUE UNIVERSITY, LAFAYETTE, INDIANA, NOVEMBER 14-16, 1962.
1964, 95p
Unclassified report

Proceedings sponsored in part by the Armed Forces Pest Control Board, Washington, D. C., the Building Research Advisory Board, NAS-NRC, Washington, D. C., and the National Pest Control Association.

Descriptors: (*Isoptera, Pest control), (*Pest control, Isoptera), Biology, Physiology, Tracer studies, Ecology, Soils, Water, Wood, Concrete, Insecticides, DDT, Toxicity, Biological assay, Buildings.

Contents:
Biology of termites
Background of environmental factors
Toxicants
Laboratory evaluation and testing
Field evaluation and testing
Suggested criteria for research, evaluation and testing methods
Future research.

AD-611 458 Div. 16

Princeton Univ., N. J.
CIRCADIAN RHYTHMS AND THE CIRCADIAN ORGANIZATION OF LIVING SYSTEMS,
by Colin S. Pittendrigh. 1960, 26p
Contract AF49 638 587
AFOSR 2381
Unclassified report

Pub. in Cold Spring Harbor Symposia on Quantitative Biology (USA) v25 p159-84 1960 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Rhythm (Biology), Adaptation (Physiology)), Photoperiodism, Drosophila, Oscillation, Light, Temperature, Mammals, Rodents, Insects, Plants (Botany), Diurnal variations, Test methods.

Contents:
Circadian rhythms; the empirical generalizations
The 2-oscillator model for the Drosophila eclosion rhythms
Circadian organization; a multi-oscillator system
The physiology of circadian organization and its breakdown.

AD-611 462 Div. 16

General Dynamics/Electronics, Rochester, N. Y.
THE EFFECT OF ACOUSTIC WAVES ON THE PACINIAN CORPUSCLE: A PRESSURE-SENSORY RECEPTOR OF THE SKIN,
by Eugene Agalides. 1964, 19p
Contract AF49 638 1185
AFOSR 65-0294 Unclassified report
Pub. in New York Academy of Sciences. Transactions (U. S.) v26 (ser 2) n6 p670-87 Apr 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*End organs, Stimulation), Skin, Sound, Sensory mechanisms, Thresholds (Physiology), Electroacoustic transducers, Electronic recording systems, Pressure.

Experiments were made which show that a mechanical stimulation of the pressure sensitive skin receptor, called the Pacinian corpuscle, can be effected by acoustic waves. It was further possible to show that no coupling between the sensory receptor and the stimulator took place. The characteristics of the transmitting medium and of the transducers used are listed.

17. Metallurgy

AD-610 893 Div. 17
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
EMISSION OF PHOTOGRAPHICALLY ACTIVE PARTICLES IN THE ATMOSPHERIC CORROSION OF METALS AND TEMPERATURE DEPENDENCE OF THE EMISSION OF PHOTOGRAPHICALLY ACTIVE PARTICLES IN THE ATMOSPHERIC CORROSION OF MAGNESIUM AND ZINC,
by I. L. Rolkh and F. E. Mazaev. 24 Feb 53, 14p
T-89-R
TT 65 61623

Unclassified report

Vydelenie Fotograficheski Aktivnykh Chastits pri Atmosfernoi Korrozii Metallov i Temperaturnaya Zavisimost' Vydeleniya Fotograficheski Aktivnykh Chastits pri Atmosfernoi Korrozii Magniya i Tsinka, trans of Akademiya Nauk SSSR. Doklady, 1948, v. 63, no. 2, p. 119-122; 1950, v. 72, no. 2, p. 335-338.

Descriptors: (*Corrosion, Radiography), (*Radiography, Corrosion), Magnesium, Aluminum, Zinc, Photographic images, Reaction kinetics, Oxidation, Temperature, Density, Films, Surface properties, Particles, USSR.

The results of experimental research on the kinetics of the emission of photographically active particles in the corrosion of magnesium, aluminum, and zinc are presented. The effect of temperature on the emission of photographically active particles by magnesium and zinc in atmospheric corrosion was studied to establish the mechanism and relationships involved.

AD-610 957 Div. 17, 4
CFSTI Prices: HC$2.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
A STUDY OF THE ELECTRO-CHEMICAL CORROSION OF MAGNESIUM,
by N. D. Tomashov, V. S. Komissarova, and M. A. Timonova. Mar 58, 36p T-243-R
TT 65-61655

Unclassified report

Trans. of Akademiya Nauk SSSR. Institut Fizicheskoi Khimii. Trudy, 1955, v. 4, p. 172-197. Also available from NRC as C-2650.

Descriptors: (*Magnesium, Corrosion), (*Corrosion, Magnesium), (*Magnesium alloys, Corrosion), Aluminum alloys, Zinc alloys, Sodium compounds, Chlorides, Solutions, Electrolysis, PH, Anodes, Polarization.

A study was made of the mechanism of magnesium corrosion in sodium chloride solutions, principally under conditions of anodic polarization of the metal.

AD-610 960 Div. 17
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
METHOD OF DETERMINING PROPAGATION VELOCITY RELATIONSHIP IN PLASTIC DEFORMATION,
by D. A. Kal'ner. Oct 57, 7p T-261-R
TT 65-61658

Unclassified report

Trans. of Zavodskaya Laboratoriya (USSR) 1956, v. 22, no. 9, p. 1086-1089.
Also available from NRC as C-2539.

Descriptors: (*Deformation, Steel), (*Steel, Deformation), Plasticity, Propagation, Velocity, Creep, Austenite, Stresses, Determination, USSR.

AD-611 011 Div. 17
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EFFECT OF LIQUID SODIUM ON RELAXATION OF STRESSES IN STEEL,
by V. I. Nikitin. 12 Feb 65, 11p FTD-TT-65-123
TT 65-61670

Unclassified report

Unedited rough draft trans. of mono. Zhidkie Metally: Sbornik Statei (Liquid Metals: Collection of Articles) Moscow, 1963, p. 300-306.

Descriptors: (*Steel, Stresses), (*Stresses, Steel), (*Sodium, Liquid metals), (*Liquid metals, Compatibility), Creep, Stainless steel, Heat of activation, Absorption, Deformation, Crystal lattice defects, USSR.

Relaxation stability of liquid sodium that is used as a heat transfer agent was studied to gain information concerning (1) selection of alloys for electric power installations and (2) the mechanism of action of liquid metals on structural alloys at high temperature. EI-583 steel (0.16% C, 16.30% Cr, 1.78% Nb, 0.88% Mo, 1.78% Si, and 0.44% Mn) was tested in a relaxation chamber following thermal treatment by normalizing from 860 degrees. The tests in sodium were made at 600 degrees with initial stresses of 16, 14, and 9 kg/sq mm. The effect of the liquid sodium on the relaxation of stresses followed this general rule: the difference in the rate of deformation (or rate of reducing stresses during relaxation) in a surface active agent and in air should be maximum at the beginning of creep (relaxation) and gradually decrease in proportion to the reduction in the role of sliding processes.

AD-611 088 Div. 17, 26
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
DETERMINING PLASTICITY OF HEAT RESISTANT ALLOYS,
by N. N. Pavlov. 28 Jan 65, 13p FTD-TT-64-798
TT 65-61722

Unclassified report

Unedited rough draft trans. of Politekhnicheskii Institut, Leningrad. Trudy (USSR) 1963, v. 222, p. 20-27.

Descriptors: (*Heat-resistant metals and alloys, Plasticity), (*Hot working, Heat-resistant metals and alloys), USSR, Torque, Deformation, Rolling (Metallurgy), Recrystallization, Pressure, Temperature.

Investigation was made to aid in rational planning for the technology of stamping, pressing and rolling processes of heat-resistant alloys. The plasticity at deposition, wedge rolling, torsion and also data on the recrystallization of heat-resistant alloys were determined.

AD-611 092 Div. 17
CFSTI Prices: HC$2.00 MF$0.50

Case Inst. of Tech., Cleveland, Ohio.

INTERFACE MOTION IN PHASE TRANSFORMATIONS. BAINITE TRANSFORMATIONS IN HYPOEUTECTOID STEELS,
by R. H. Goodenow, R. H. Barkalow, and R. F. Hehemann. Feb 65, 34p Technical rept. no. TR-2
Contract Nonr1114115

Unclassified report

Descriptors: (*Steel, Grain structures (Metallurgy)), (*Bainite, Transformations), Phase studies, Crystal growth, Heat treatment, Quenching (Cooling), Nucleation, Thermodynamics, Metallography.

Kinetic and structural aspects of bainite formation were studied by stepped transformation experiments. Growth of lower bainite stops if the temperature is raised to the upper range and upper bainite either stops growing or grows at a rate substantially below that of lower bainite when the temperature is reduced suddenly to the lower range. It is concluded that the internal structural differences which characterize upper and lower bainite exert a significant influence on the rate at which these products develop. In the steels studied in this investigation, lower bainite plates thicken from one side only. These plates exhibit a substructural unit oriented at an angle to the growth direction and these units appear to nucleate at the immobile side of the plates. Edgewise growth rates measured on the hot stage thus may reflect primarily the rate of nucleation of these substructural units. A similar situation may prevail in the growth of upper bainite needles. (Author)

AD-611 105 Div. 17, 30
CFSTI Prices: HC$0.50 MF$0.50

Army Materials Research Agency, Watertown, Mass.
MICROSTRUCTURE DETERMINATION OF MOLYBDENUM-CHROMIUM-VANADIUM STEEL BY MAGNETIC ANALYSIS,
by Rudolph V. Ginangrande. Nov 64, 20p
AMRA TR-64-36
Proj. 15021

Unclassified report

Descriptors: (*Steel, Microstructure), (*Microstructure, Test methods), Magnetic properties, Electric currents, Electrical impedance, Molybdenum alloys, Chromium alloys, Vanadium alloys, Ferromagnetic materials, Hysteresis, Harmonic analysis, Fourier analysis, Coils, Magnetic fields, Electromagnetic properties.

The theory of complex coil impedance is presented and the effect of steels with varying microstructures on impedance behavior is indicated. A system design employing harmonic analysis is presented and correlations of electromagnetic properties to microstructure are discussed. (Author)

AD-611 196 Div. 17, 12
CFSTI Prices: HC$5.00 MF$1.25

Syracuse Univ., N. Y. Research Inst.
AEROSPACE STRUCTURAL METALS HANDBOOK. VOLUME I. FERROUS ALLOYS,
ed. by V. Weiss and J. G. Sessler. Dec 63, 179p
Contract AF33 616 7792, Proj. 7381, Task 738103
ASD TDR-63-741 V1 suppl. 1

Unclassified report

Descriptors: (*Handbooks, Alloys), (*Alloys, Handbooks), (*Aerospace craft, Materials), Airframes, Structures, Chemical properties, Mechanical properties, Physical properties, Fracture (Mechanics), Toughness, Indexes, Metals, Steel, Stainless steel, Austenite, Martensite, Hardening, Aging (Materials), Nickel alloys, Chromium alloys, Molybdenum alloys, Cobalt alloys, Titanium alloys, Manganese alloys, Vanadium alloys, Carbon alloys, Niobium alloys, Tungsten alloys, Aluminum alloys.

The 'Aerospace Structural Metals Handbook' with the insertion of the first revision packet of 17 new alloy chapters, now contains physical, chemical and mechanical property information on 155 metals and alloys of interest for aerospace structural applications. The Handbook consists of two volumes; Volume I, 'Ferrous Alloys' (AD-443 104), and Volume II, 'Non-Ferrous Alloys' (AD-443 104), each volume self-contained in a loose-leaf, standard 3 post binder. Volume I contains 60 ferrous alloy chapters and Volume II contains 95 non-ferrous alloy chapters. Major revision and updating has been applied to 8 of the existing alloy chapters. Further periodic revision and updating of alloy chapters are planned for the future. The Handbook also contains data source reference, a general discussion of properties, a glossary of terms, a discussion of fracture toughness and a cross-index of alloys contained therein. (Author)

AD-611 197 Div. 17, 4, 25
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia. School of Metallurgical Engineering.
THE STRUCTURE OF DIMOLYBDENUM CARBIDE BY NEUTRON DIFFRACTION TECHNIQUE,
by Edwin Parthe and Varadachari Sadagopan. 1962, 11p
Contract AF49 638 1027
AFOSR 2386; N62 12585

Unclassified report

Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge, Mass.

Descriptors: (*Molybdenum compounds, Carbides), (*Carbides, Crystal substructure), (*Neutron diffraction analysis, Carbides), Phase studies, Powders, Molecular structure, Crystal lattices.

It is generally believed that Mo2C has either the hexagonal C6 Cadmium iodide anti-type structure or the related hexagonal L'3 structure. A neutron diffraction study showed that this is not the case. Mo2C crystallizes with an orthorhombic unit cell with a = 4.72 sub 4A, b = 6.00 sub 4A, and c = 5.19 sub 9A. The atomic arrangement of Mo2C presents a new structure type. Space group is D(14)2h - Pbcn. Eight molybdenum atoms are in 8d) with x = 1/4, y = 1/8, z = 1/12 and four carbon atoms are in 4c) with y = 3/8. The carbon atoms in Mo2C arrange themselves in such a way, that each molybdenum atom has three nearly planar carbon neighbours. (Author)

AD-611 216 Div. 17, 25
CFSTI Prices: HC$1.00 MF$0.50

Stanford Univ., Calif.
INFLUENCE OF STACKING FAULT ENERGY ON HIGH TEMPERATURE CREEP OF PURE METALS,
by Craig R. Barrett and Oleg D. Sherby. 1 Jan 65, 13p Technical rept. no. TR-4, DMS-65-4
Contract Nonr22560, Proj. NR031 682

Unclassified report

Descriptors: (*Crystal lattice defects, Metals), (*Metals, Creep), (*Creep, High temperature research), Silver, Copper, Nickel, Aluminum, Stresses, Elasticity, Heat of activation, Strain (Mechanics), Fracture (Mechanics).

The creep characteristics of four pure metals with widely varying stacking fault energies (Ag, Cu, Ni and Al) were evaluated above 0.5 Tm. Creep tests were performed under conditions of constant atomic diffusivity and constant stress over the elastic modulus. The steady state creep rate was found to be a function of the stacking fault energy such that steady state creep rate is proportional to stacking fault energy (3.5). In addition, it was uncovered that the primary creep strain and the strain to fracture increased with increasing stacking fault energy and that the ratio of initial to steady state creep rate decreased with increasing stacking fault energy. (Author)

AD-611 407 Div. 17, 26
CFSTI Prices: HC$3.00 MF$0.75

David Taylor Model Basin, Washington, D. C.
THE EFFECTS OF TEMPERED NONMARTENSITIC PRODUCTS ON THE NOTCH TOUGHNESS AND MECHANICAL PROPERTIES OF AN HY-80 STEEL,
by A. R. Willner and M. L. Salive. Jan 65, 62p
Rept. no. 1605
Proj. S R001 01 01, Task 0401
Unclassified report

Descriptors: (*Steel, Metallurgy), Nickel alloys, Chromium alloys, Molybdenum alloys, Heat treatment, Toughness, Mechanical properties, Metallography, Microstructure, Grain structures (Metallurgy), Ferrites, Ductility, Transition temperature, Metal plates.

This report discusses the effects of nonmartensitic products and mechanical properties on the nil-ductility-transition (NDT) temperature and transverse Charpy V-notch absorption level, for a selected HY-80 steel. Proeutectoid ferrite was found to have the most detrimental effect on the transverse Charpy maximum energy level. Large prior austenitic grain size, irrespective of microstructure, increases the NDT temperature by approximately 100 F. It is recommended that the present HY-80 specification be amended to require two chemistry ranges, one for thin and one for thick plates. (Author)

AD-611 421 Div. 17
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
METHOD OF IMPREGNATING HIGH MELTING METALS IN A GAS MEDIUM, FOR EXAMPLE, WITH ALUMINUM, SILICON, AND ZIRCONIUM,
by B. N. Arzamasov and D. A. Prokoshkin. 15 Feb 65, 5p FTD-TT-64-966
TT 65-61761 Unclassified report

Unedited rough draft trans. of Russian patent 148318 (appl. no. 723166/22-2, 23 Mar 61).

Descriptors: (*Metal coatings, Impregnation), Patents, USSR, Gases, Diffusion, Metals, Controlled atmospheres, Furnaces, Aluminum, Silicon, Zirconium.

Object of the Invention: A method of impregnating high-melting metals in a gas medium, for example with aluminum, silicon, and zirconium, with the use of a 'two-story' muffleless furnace, which is distinguished by the fact that for the purpose of decreasing the consumption of gas and improving the sanitary conditions, the gas medium which is the carrier of the diffusing element of the coating onto the metal to be coated is put into circulation in a hermetically sealed space in the working chamber of the furnace and is used over and over again in the process of impregnation. (Author)

AD-611 424 Div. 17
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
EFFECT OF LIQUID SODIUM ON ENDURING STRENGTH OF STRUCTURAL MATERIALS,
by G. P. Dykova and V. I. Nikitin. 15 Feb 65, 12p
FTD-TT-64-1210
TT 65-61764
Unclassified report

Unedited rough draft trans. of mono. Zhidkie Metally: Sbornik Statei (Liquid Metals: Collection of Articles) Moscow, 1963, p. 292-299.

Descriptors: (*Sodium, Liquid metals), (*Liquid metals, Corrosion inhibition), (*Corrosion inhibition, Liquid metals), Corrosion-resistant alloys, Chromium alloys, Nickel alloys, Steel, Toughness, Creep, Metallography, High-temperature research, USSR.

The durable strength in liquid sodium and in air of EI-851 steel at 700 degrees, EI-869 alloy at 750 degrees and EI-437 B alloy at 800 degrees was determined. The absence of liquid metal effect on the durable strength and creep of EI-851 steel and EI-869 alloy was shown. The EI-437 B alloy revealed a reduction in durable strength and plasticity and an increase in rate of creep at all periods in a liquid metal medium. It was established that the dependence of time prior to destruction and rate of creep upon the stress applied to EI-437 B alloy in liquid metal is gradual, just as it is in air. It was shown, that the effect of liquid sodium on durable strength and creep of EI-437 B alloy at 800 degrees is determined by the adsorption properties of the medium. The detected adsorption effect of liquid metal confirmed the mechanism of overcreeping of dislocations under creep conditions. (Author)

18. Military Sciences and Operations

AD-610 836 Div. 18, 1, 15, 33
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
A MODEL FOR EVALUATING FLEETS OF TRANSPORT AIRCRAFT,
by John R. Summerfield. 12 Jan 60, 18p P-1882
Unclassified report

To be presented at the International Conference on Operational Research (2nd), Aix-En-Provence, France, Sep 60.

Descriptors: (*Air transportation, Simulation), (*Mathematical models, Air transportation), (*Logistics, Air transportation), Monte Carlo method, Fleets, Transport planes, Effectiveness, Flight paths.

A Monte Carlo model is described which can be used in evaluating the capability of both actual and possible transport systems to meet the airlift demands of the U. S. military establishment. The model includes peacetime flying activities, wartime deployments, and the transition from peace to war. Transports fly through a simulated route structure according to rules determined by aircraft and load characteristics and by random elements of wind, temperature, and aircraft maintenance. A fleet's performance is judged by its cumulative delivery, over time, of materiel and personnel to a specified combat zone. The model thus helps in making comparisons among different transport fleets. It can also be used to detect bottlenecks in a particular transport system. (Author)

AD-611 012 Div. 18, 1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
REVOLUTION IN MILITARY SCIENCE, ITS IMPORTANCE AND AFTEREFFECTS ON MAN, ALTITUDE AND SPEED,
by V. Bolotnikov. 2 Feb 65, 9p FTD-TT-64-529
TT 65-61671
Unclassified report

Unedited rough draft trans. from Krasnaya Zvezda (USSR) 1964, 25 Apr, p. 2.

Descriptors: (*Aerial warfare, Performance (Human)), (*Military tactics, Aerial warfare), Weapon systems, Aircraft, Airspeed, High altitude, Military personnel, Aviation personnel, Time, Theory, USSR.

A discussion is presented of the role of man in modern aerial warfare.

AD-611 170 Div. 18, 23
CFSTI Prices: HC$1.00 MF$0.50

Matrix Corp., Arlington, Va.
THE DEVELOPMENT OF A FAULT ISOLATION/CORRECTION TEXT AND TROUBLESHOOTING DIAGRAMS FOR THE AN/FST-2B SAGE COORDINATE DATA PROCESSOR.
Final rept. for Jan-Dec 64,
by Edward C. Weiss. Dec 64, 24p
Contract AF19 628 555
ESD TDR-64-664
Unclassified report

Descriptors: (*Maintenance personnel, Training), (*Air Defense Command, Maintenance personnel), (*Data processing systems, Malfunctions), Radar equipment, Air force personnel, Performance (Human), Command and control systems.

This report documents the development of a Fault Isolation/Correction Text and associated troubleshooting diagrams for SAGE AN/FST-2B maintenance technicians. These materials supplement the Job Proficiency Guide in order to enhance Phase I and Phase II troubleshooting performance. Phase I troubleshooting is defined as fault isolation to a major functional area of the equipment. Phase II troubleshooting is defined as fault isolation within a major functional area to a line replaceable unit. The Phase I diagram utilizes the built-in system readouts. The Phase II diagrams are used in conjunction with a standard oscilloscope. The trouble-shooting procedures terminate in the use of existing logic diagrams. The materials are comprehensive and account for individual differences in technician performance capability. The approach utilized to develop these materials is a further evolution and refinement of a previously developed methodology which was empirically validated in the field. (Author)

AD-611 175 Div. 18, 15, 26
CFSTI Prices: HC$3.00 MF$0.75

DECISION Studies Group, Palo Alto, Calif.
A MULTIECHELON PROVISIONING AND RESUPPLY DECISION PROCEDURE.
Final rept.,
by Stuart A. Bessler. Dec 64, 59p
Contract Nonr445700, Proj. NR347 001
Unclassified report

Descriptors: (*Armed forces procurement, Optimization), (*Inventory control, Armed forces procurement), Management engineering, Stock level control, Material control, Supply depots, Decision theory, Probability, Dynamic programming.

A Polaris type multiechelon supply system consisting of a depot and k tenders is considered. Items can be stored at the tenders and at the depot. Replenishment of the tenders and the depot is made periodically. Emergency shipment between the depot and a tender is made when a unit is demanded from a tender with no remaining stock. No intertender shipments are permitted. With the appropriate cost structure on optimal multiechelon inventory procedure is a critical vector y, such that at the beginning of an order period the jth stock point orders to bring its stock up to y sub j where y sub j is the jth component of the vector y. An algorithm with which to compute y has been formulated and illustrated with a system composed of a depot and 3 tenders. Optimal inventory procedures for various combinations of unit cost, shortage cost, emergency shipment cost, discount factor and failure probability have been computed and tabulated.

AD-611 223 Div. 18, 13, 33
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
ORGANIZATIONAL MAINTENANCE IN THE SOVIET AIR FORCE,
by Andris Trapans. Jan 65, 47p RM-4382-PR
Contract AF49 638 700
Unclassified report

Descriptors: (*Armed forces (Foreign), USSR), (*Air force operations, Maintenance), (*Maintenance, Air Force operations), Ground support equipment, Military organizations, Air force equipment, Maintenance equipment, Maintenance personnel, Engineering personnel, Logistics, Fighters, Bombers, Mobilization, Aircraft.

Since 1961 the Soviets have devoted considerable attention to improving base-level maintenance support of military aircraft. These efforts have shown, on one hand, a recognition of the need for keeping logistic support in pace with the increasing complexity of aircraft systems and equipment, on the other, the presence of a number of practical problems and areas of difficulty hampering the achievement of satisfactory solutions. This memorandum surveys the institutional setting in which base-level maintenance is performed in the Soviet Air Force, notes the chief areas of apparent difficulty, and examines some of the solutions advanced. While a number of topics are touched upon, the main discussion concerns maintenance management. The time period considered is bracketed by the years 1960 and 1964.

AD-611 260 Div. 18, 20
CFSTI Prices: HC$5.00 MF$1.00

Naval Radiological Defense Lab., San Francisco, Calif.
EVALUATION OF COUNTERMEASURE SYSTEM COMPONENTS AND OPERATIONAL PROCEDURES,
by W. E. Strope. 14 Aug 58, 160p
Proj. 32 3
WT 1464

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Shelters, Effectiveness), (*Nuclear explosions, Countermeasures), Radiation measurement systems, Radiological contamination, Decontamination, Radiation monitors, Radioactive fallout, Feasibility studies, Gamma rays, Dosimeters, Shielding, Ventilation, Gas filters, Airburst.

The objective was to evaluate some operational characteristics of a radio-logical shelter and to determine values for some countermeasures-system parameters. The operation consisted of two phases, the first involving measurements made by project personnel in a manned station having the characteristics of a high-performance radiological shelter and the second involving monitoring and reclamation operations in an area near the shelter beginning about 1 hr after burst. Measurements were made inside the shelter beginning at shot time to (1) test a simple shelter monitoring system, (2) test a proposed ventilation intake configuration intended to eliminate a requirement for filtration of the shelter air supply, (3) determine the effective gamma-radiation shielding afforded by an operational shelter, including two different exhaust ventilation configurations and a simple entrance configuration, and (4) determine those radiation and fallout characteristics needed to evaluate the operational measurements. The second phase involved (1) the test of a key-point initial monitoring technique, (2) the test of two proposed techniques for determining reclamation effectiveness in advance of reclamation operations, (3) the test of the feasibility of achieving a residual number of 0.01 in a cleared area, and (4) the test of a barrier as an alternative to a buffer zone.

19. Navigation

AD-611 445 Div. 19, 1, 33
CFSTI Prices: HC$4.00 MF$0.75

National Aviation Facilities Experimental Center, Atlantic City, N. J.
EXPERIMENTATION WITH FLARESCAN VERTICAL GUIDANCE LANDING SYSTEM.
Final rept.,
by V. Bencivenga. Nov 64, 110p Rept. no. RD-64-150
Proj. 114 012 00X

Unclassified report

Descriptors: (*All-weather aviation, Instrument landings), (*Instrument landings, Glide path systems), (*Glide path systems, Microwave equipment), (*Aviation safety, Instrument landings), Approach, Flight paths, Guidance, Landing aids, Special purpose computers, Flight testing, Feasibility studies, Civil aviation, Radio scanning.

Static and dynamic tests were conducted on Flarescan, a vertically scanned microwave guidance system, to determine its suitability for use in an all-weather landing system. Areas of investigation included low-angle coverage, position determining accuracy, siting effects, noise content, scan rate, scan direction, method of signal coding, type of antenna pattern, weather effects, interference susceptibility, optimum flight path characteristics, etc. (Author)

AD-611 446 Div. 19, 1, 33
CFSTI Prices: HC$4.00 MF$1.00

National Aviation Facilities Experimental Center, Atlantic City, N. J.
EXPERIMENTATION WITH REGAL VERTICAL GUIDANCE LANDING SYSTEM.
Final rept.,
by V. Bencivenga and E. J. Murphy. Nov 64, 117p
Rept. no. RD-64-149
Proj. 114 009 00X

Unclassified report

Descriptors: (*All-weather aviation, Instrument landings), (*Instrument landings, Glide path systems), (*Glide path systems, Microwave equipment), (*Aviation safety, Instrument landings), Ranges (Distance), Approach, Flight paths, Guidance, Landing aids, Flight testing, Feasibility studies, Civil aviation, Radio scanning.

Static and dynamic tests were conducted on REGAL (Range and Elevation Guidance for Approach and Landing), a vertically scanned microwave guidance system, to determine its suitability for use in an All-Weather Landing System. Areas of investigation included low-angle coverage, position determining accuracy, siting effects, noise content, scan rate, scan direction, method of signal coding, type of antenna pattern, weather effects, interference susceptibility, optimum flight path characteristics, etc. Aircraft using REGAL guidance information, coupled to various approach and flare couplers, were flown to touchdown using both manual and automatic control. Flight tests were conducted in a C-54G, Aerocommander, JC-131B and B-25 aircraft in both clear and adverse weather including rain, snow and fog with wind conditions varying from direct head winds to tail wind components of 20 to 25 knots. During the test program, more than 200 automatic landings were accomplished using various combinations of approach paths, flare paths and error signals. The results of these tests as well as design changes and future program requirements are discussed in this report. (Author)

AD-611 448 Div. 19, 1
CFSTI Prices: HC$4.00 MF$1.00

National Aviation Facilities Experimental Center, Atlantic City, N. J.
OPERATION ACCORDION. NAVIGATIONAL ACCURACIES OF CIVIL JET AIRCRAFT OVER THE NORTH ATLANTIC, FEB. 1962-SEPT. 1963. VOLUME II.
Final rept. vol. 2,
by Irving Hirsch and Ronald Braff. Dec 64, 127p
Proj. 116 30R
FAA RD-64-52 V2

Unclassified report

Descriptors: (*Navigation, Jet planes), (*Jet planes, Navigation), (*Civil aviation, Navigation), Doppler systems, Doppler navigation, Radar, Atlantic Ocean, Horizontal indicators, Statistical analysis, Tables, Data, Errors, United States, Great Britain, Canada.

The report presents navigational accuracies over the North Atlantic during the period February 1962 through September 1963. The results are based upon data collected from approximately 5,000 Accordion designated civil jet flights of fourteen participant airlines. The measurements were made by four radars, viz., Gander, Goose, OSV Charlie, and Killard. In addition, considerable quantities of data were supplied by the airlines from Accordion flight logs. The administration of Operation Accordion comprised a condominium of the United States, the United Kingdom, and Canada. The primary purpose of the program was to provide information for decisions on current requirements for horizontal separation standards. Subordinate objectives included the procurement of information concerning the affects of different operational and external environments upon navigational accuracy. The statistical theory and methodology employed to obtain the results are included. (Author)

20. Nuclear Physics and Nuclear Chemistry

AD-610 931 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
A HEAVY-CURRENT MICROTRON,
by S. P. Kapitza, V. P. Bykov, and V. N. Melekhin.
Jan 61, 5p T-348-R
TT 61-12598

Unclassified report

Trans. of Zhurnal Eksperimental'noi i Teoreticheskoi Fiziki (USSR) 1960, v. 39, no. 4(10) p. 997-1000.
Also available from NRC mi$0.50, ph$1.50 as C-3552, 4p.

Descriptors: (*Electron accelerators, Cyclotrons), (*Cyclotrons, Particle trajectories), (*Particle trajectories, Electrons), Electron beams, Resonators, Electron capture, Cathodes, Cyclotron resonance phenomena, USSR.

Some preliminary data are presented concerning a new efficient cyclic accelerator of electrons for energies of 5-15 MeV. The accelerator is of the electron cyclotron type. The efficiency of electron capture into resonance orbits and also the general efficiency of the accelerator are appreciably increased by injecting the electrons from a hot cathode located directly in the resonator. The energy and momentum spread of the accelerated electrons is not large. (Author)

AD-610 963 Div. 20, 24
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
AN INTERESTING VARIATION OF A CLASSIC EXPERIMENT.
by K. V. Chmutov. Oct 57, 2p T-267-R
TT 65 61661

Unclassified report

Trans. of Priroda (USSR) 1957, v. 46, no. 9, insert facing page 120.

Descriptors: (*Radioactive decay, Uranium compounds), (*Autoradiography, Uranium compounds), (*Uranium compounds, Radioactive decay), Salts, Natural radioactivity, Luminescence, Photographic images, USSR.

Some decades have passed since the classic experiment of Henri Becquerel, who discovered the effect which the rays emitted by uranium salts exerted on a photographic plate wrapped in black paper. Very often an old experiment may be revived in an interesting modern form. Such a variation is described in the present note.

AD-611 010 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SPECTRUM OF GAMMA-RADIATION AND PARTIAL VALUES OF ABSORBED ENERGY IN AN ARBITRARY HOMOGENEOUS MIXTURE,
by V. A. El'tekov, B. M. Terent'ev, and M. V. Panchvidze. 3 Feb 65, 13p FTD-TT-65-79
TT 65-61669

Unclassified report

Unedited rough draft trans. of Atomnaya Energiya (USSR) 1964, v. 16, no. 4, p. 291-295.

Descriptors: (*Gamma rays, Absorption), USSR, Mixtures, Energy, Numerical analysis, Integral equations, Differential equations, Monte Carlo method, Density.

A generalized discussion is given of approximation methods of transition, from an accurate integral equation, for spectral density of gamma-quanta, to differential equation of first order. It is shown that the coefficients of the latter can be various functions from a certain class.

AD-611 028 Div. 20, 15, 25
CFSTI Prices: HC$2.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
THE PROBLEM OF AMBIGUITY IN THE PHASE SHIFT ANALYSIS OF SCATTERING PROCESSES,
by Nien-ning Huang. Jun 64, 34p E-T-Ch-64-13
Contract AF19 628 3869
TT 65-61679

Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) 1963, v. 19, no. 5, p. 306-319.

Descriptors: (*Elastic scattering, Nuclear particles), (*Selection rules, Elastic scattering), (*Nuclear particles, Elastic scattering), Meson scattering, Nuclear scattering, S-matrix, Spin, Matrix algebra, Transformations (Mathematics), Differential cross section, Scattering, Parity, China, Phase shift, Momentum.

Starting from the conditions which should be satisfied by the existence of different choices in phase shift analysis, this paper discusses the general ambiguity in the analysis of elastic scattering of particles with arbitrary spins. The transformation matrices among the different sets of phase shifts are given and the real para-meters involved are determined by the system of second order algebraic equations. The problem of ambiguity in the phase shift analysis therefore is reduced to finding the real roots of these equations. The number of different sets of real roots is twice that of the different choices in the phase shift. Therefore, generally kinematic ambiguity in phase shift analysis is solved. The ambiguity in the phase shift analysis corresponds to the spin motion which conserves the components of spin-tensors in the direction of momentum, and the parameters which characterize this type of general spin motion take fixed values. From the properties of the algebraic equations, it is proposed that the ambiguity in cases of whole integral spin is much less than in cases of half integral spin.

AD-611 184 Div. 20, 25
CFSTI Prices: HC$4.00 MF$1.00

Saint Louis Univ., Mo.
ELECTRONIC AND NUCLEAR PARAMAGNETISM AND ENERGY EXCHANGE MECHANISMS.
Annual technical rept. (Interim rept. no. 1) Sep 63-Sep 64,
by W. A. Barker, R. K. Jeck, S. K. Misra, and R. F. O'Brien. Dec 64, 119p
Contract AF30 602 2907, Proj. 8503, Task 850302
RADC TDR-64-455

Unclassified report

Descriptors: (*Nuclear magnetic resonance, Paramagnetic resonance), (*Paramagnetic materials, Nuclear magnetic resonance), Atomic energy levels, Electron transitions, Cryogenics, Nuclear spins, Color centers,

Alkali metal compounds, Halides, Pumping (Electronics), X-ray absorption analysis, Crystal lattice defects, Single crystals, Polarization, Excitation, Ruby.

In this experimentation it has been shown that the Na and Li nuclear magnetic resonance signal may be enhanced in NaCl and LiF by the EPR pumping of 'forbidden' transitions in which advantage is taken of the coupling between the Cl2(-) center or the F2(-) center and the host alkali nucleus. Evidently these centers affect the adjacent anion nuclei first and then this local polarization becomes rapidly diffused from one alkali nucleus to the next. This requires a spin diffusion rate which is fast compared to the nuclear spin lattice relaxation rate. A successful phenomenological theory has been developed to explain these effects at liquid N2 temperatures. An enhancement of 18 of the A127 nuclear magnetic signal by means of the Solid Effect has been observed at 78K in a sample of Al203 doped with small amounts of Cr(III). Will the data on the Al in Cr(III) doped Al2O3 follow the proposed phenomenological theory of the Solid State Effect. The basic work on spin diffusion as summarized in Section 4 should provide a solid theoretical foundation for the phenomenological theory. (Author)

AD-611 198 Div. 20, 22, 25, 30
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.
GAMMA RAY SPECTROMETER DATA PROCESSING PROGRAMS,
by Susan Madigosky and R. T. Woodham.
19 Nov 64, 48p NOLTR-64-220
Contract AT49 7 2430 Tasks FR43, 753AEC
Unclassified report

Descriptors: (*Gamma-ray spectroscopy, Programing (Computers)), (*Programing (Computers), Gamma-ray spectroscopy), Data processing systems, Spectrum analyzers, Display systems, Nuclear radiation spectrometers, Gamma-ray spectra, Compton scattering, Photoelectric effect (Gamma rays), Pair production, Pulse height analyzers, Programming languages, Digital computers, Underwater equipment, Scintillation counters.

Two computer programs have been written to analyze and display (plot) the spectral output of two different gamma-ray spectrometers. These spectrometers are the anti-Compton spectrometer currently in use in NOL's Van de Graaff facility and the Deep Underwater Nuclear Counter (DUNC). Both programs have been written for use with an IBM 7090 computer. The program for the anti-Compton spectrometer adds (subtracts) in variable amounts spectra which are stored in one half of a multichannel analyzer to those stored in the other half. It also performs necessary energy or total count normalization, calculates statistical errors and displays the processed data on linear or semi-logarithmic plots. The DUNC program is used to prepare magnetic tape from a paper punch tape output of a multichannel analyzer. It also searches the magnetic tape for spectra to be normalized, operated upon arithmetically and displayed in printed, punched card or graphic form on the CalComp plotter. (Author)

AD-611 201 Div. 20, 4
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
CHEMICAL DOSIMETRY OF THE USAEL 3.5 KILOCURIE COBALT 60 IRRADIATION SOURCE.
by Carol K. Pearce and Joseph E. Ellison, Jr.
Nov 64, 15p Technical rept. ECOM-2540
Proj. 1C0 14501B31A, Task 1C0 14501B31A00
Unclassified report

Descriptors: (*Cobalt, Gamma emission), (*Gamma rays, Calibration), (*Dosimeters, Radiation chemistry), Iron compounds, Sulfates, Oxidation, Dose rate.

Results are reported on the calibration of the 3.5 kilocurie cobalt 60 irradiation source recently installed at USAEL, using ferrous sulfate chemical dosimetry. (Author)

AD-611 214 Div. 20, 25
CFSTI Prices: HC$1.00 MF$0.50

California Univ., Berkeley.
SPIN INTERACTIONS IN SOLIDS.
Status rept. for 1 Jul-30 Sep 64,
by C. D. Jeffries. 1 Oct 64, 4p
Contract Nonr22261, Proj. NR018 408
Unclassified report

Descriptors: (*Nuclear spins, Solids), (*Solids, Nuclear spins), Crystal lattices, Phonons, Low-temperature research, Nuclear resonance, Paramagnetic resonance, Magnetic fields, Microwave frequency, Spin, Vibrations.

A summary is given of research in electron and nuclear spin systems and their dynamic interactions with each other and with the phonons of the lattice vibrations. This research deals with nuclear magnetic and paramagnetic resonance in solids at low temperatures, dynamic nuclear orientation, spin-lattice relaxation, microwave phonons, hyperfine interactions in solids, spin-spin interactions and magnetic ordering at low temperatures, nuclear spin refrigerators, and polarized nuclear targets. Lists are provided of personnel and publications.

AD-611 231 Div. 20, 13
CFSTI Prices: HC$3.00 MF$0.75

Health and Safety Lab., Atomic Energy Commission, New York.
PROTECTION AGAINST FALLOUT RADIATION IN A SIMPLE STRUCTURE,
by A. J. Breslin, P. Loysen, and M. S. Weinstein.
Apr 62, 55p
Proj. 32 1
WT 1462
Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Radioactive fallout, Shielding), (*Shielding, Radioactive fallout), (*Civil defense systems, Radioactive fallout), Shelters, Protective coverings, Structures, Gamma rays, Dose rates, Radiation measurement systems, Health physics.

A reinforced Butler building was exposed to fallout from Shots Diablo and Shasta, and the resulting dose rates and fallout deposition inside and outside the structure were measured with various instruments and techniques. Protection factors and roof and ground contributions to the total dose rates at points within the structure were determined from the measurements. Comparisons were made with the results of theoretical and other experimental studies. Information obtained from this experiment should be of value as basic experimental data for fallout protection work, although it is recommended that additional substantiative data be obtained under more controlled conditions. (Author)

AD-611 233 Div. 20, 2, 22
CFSTI Prices: HC$3.00 MF$0.75

Sandia Corp., Albuquerque, N. Mex.
SUBSURFACE MOTION FROM A CONFINED UNDERGROUND DETONATION. PART I,
by William R. Perret. May 61, 73p
Proj. 26 4b
WT 1529

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Nuclear explosions, Seismology), (*Seismology, Nuclear explosions), (*Underground explosions, Nuclear explosions), Acceleration, Accelerometers, Rock (Geology), Earth, Motion, Shock waves, Propagation, Velocity, Instrumentation, Strain gages.

Particle motion measurements were made within the mesa adjacent to Rainier shot (1.7kt) of Operation Plumbbob on both a horizontal and a vertical radius. Principal information was derived from radial component acceleration data. Horizontal radius data were obtained over a range from 100 feet to 1355 feet from the source; vertical radius data were obtained over a range from 366 feet to the surface at 896 feet. Most of the accelerometers used by Project 26.4b were given set ranges below the actual peak accelerations produced by Rainier. A consequence of this was that many records required use of a nonlinear calibration procedure and a few included peaks truncated by saturation of the recording system. All acceleration data were integrated to particle velocity and displacement information. Peaks were added to truncated records to produce velocity-time data which implied return to zero velocity at a reasonable time after initial motion. Peak horizontal accelerations decay inversely as the fourth power of radial range to about 5g at 500 feet, then progressively as the inverse second and first powers. Peak vertical accelerations decrease as the inverse second power up to the base of the welded tuff (rhyolite) cap rock. Above that point accelerations increase, presumably as a result of reflection phenomena in a medium of decreasing seismic impedance as the surface is approached.

AD-611 235 Div. 20, 22, 23
CFSTI Prices: HC$2.00 MF$0.50

Federal Civil Defense Administration, Washington, D. C.
FIELD RADIOLOGICAL DEFENSE TECHNICAL OPERATIONS,
by B. C. Killian and A. H. Emmons. Mar 58, 31p
Proj. 36 1
WT 1482

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Nuclear explosions, Civil defense systems), (*Civil defense systems, Radiological warfare), (*Radiological warfare, Civil defense systems), (*Health physics, Training), Civilian personnel, Health physics instrumentation, Instruction manuals.

The project was conducted to provide orientation, instruction, and practical training in radiological defense technical operations associated with a fallout radiation field. Techniques employed were foot surveys, vehicle surveys, and aerial surveys utilizing standard FCDA radiation detection instruments and other equipment. During field exercises data were collected for the evaluation of the several monitoring techniques on the beta-gamma ratio and in support of the technical projects of Program 35 conducting decontamination studies and aerial survey techniques. The orientation program included briefings on the weapons testing program, scientific projects designed to improve the state of knowledge of the characteristics of fallout radiation, and the use of test results in radiological defense planning. The objectives of the training projects were fulfilled. The response of participants was favorable; and participants recommended that the training projects be continued in future continental series.

AD-611 236 Div. 20, 22
CFSTI Prices: HC$1.00 MF$0.50

Food and Drug Administration, Washington, D. C.
BLAST EFFECTS ON GLASS VACUUM CONTAINERS,
by Edwin P. Laug and Harold V. Leininger.
Mar 58, 10p
Proj. 38 III
WT 1461

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.
Prepared in cooperation Federal Civil Defense Administration, Battle Creek, Mich.

Descriptors: (*Nuclear explosion damage, Containers), (*Containers, Glass), (*Glass, Containers), Nuclear explosions, Blast, Vacuum, Laboratory equipment.

Case lots of Federal CivilDefense Administration perfusion and blood-collecting bottles were exposed to a nuclear explosion of approximately twice nominal yield. The bottles, packed six to a paperboard carton, were exposed in trenches 1/4 and 1/2 mile from Ground Zero (GZ). There was 40 per cent failure in the 1000-ml perfusion bottles with limited evacuated head space and 23 per cent failure in those bottles with the vacuum relieved before exposure. There were no failures in the blood-collecting bottles containing 120 ml of fluid with 600 ml of evacuated head space. Greatest failure in the 1000-ml perfusion bottles occurred in the cartons placed on their sides with the tops facing GZ. Sterility and pyrogen tests of the bottle contents indicated that there were no 'hidden failures' in any bottle seals. (Author)

AD-611 237 Div. 20, 29
CFSTI Prices: HC$1.00 MF$0.50

Food and Drug Administration, Washington, D. C.
EFFECT OF FALLOUT CONTAMINATION ON PROCESSED FOODS, CONTAINERS, AND PACKAGING,
by Harold V. Leininger, Edwin P. Laug, Homer J. McConnell, Raymond . Chapman, and Stephen E. Koelz. Mar 58, 18p
Proj. 38 1I
WT 1496

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.
Prepared in cooperation with Federal Civil Defense Administration, Battle Creek, Mich.

Descriptors: (*Nuclear explosions, Radiation effects), (*Food, Radiation effects), (*Containers, Radiation effects), (*Packaging, Radiation effects), (*Radiological contamination, Radiation effects), Radioactive fallout, Irradiated food, Plastics, Paper, Textiles, Cleaning, Decontamination, Effectiveness, Tests.

The effect of a comparatively low level of fallout on the protective qualities of 18 packaging materials was

examined. It was found that the plastics and paper tested were adequate for preventing contamination of foods packaged therein; by contrast, burlap and cloth offered poor protection. Oily or dusty surfaces proved more retentive for fallout than clean ones. Of the cleaning measures tried, wet or dry cloth wiping seemed to be the most effective, with detergent washing and brushing next in order. Many retail packages, particularly those with a waxed-paper overwrap, retained considerable amounts of fallout. There were, however, only two cases in which contamination of the contents of retail packages could be demonstrated. (Author)

AD-611 238 . Div. 20, 29
CFSTI Prices: HC$2.00 MF$0.50

Food and Drug Administration, Washington, D. C.
MEASURING AND MONITORING TRAINING EXERCISE: FOODSTUFFS,
by Homer J. McConnel, Raymond D. Chapman, Alan T. Spiher, Edwin P. Laug, and Stephen E. Koelz.
Dec 59, 27p
Proj. 38 3
WT 1498

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.
Prepared in cooperation with Office of Civil and Defense Mobilization, Battle Creek, Mich.

Descriptors: (*Food, Radiological contamination), (*Radiation measurement systems, Feasibility studies), (*Radiological contamination, Cetermination), Radiation monitors, Instrumentation, Collecting methods, Irradiated food, Training, Portable, Decontamination, Radioactive fallout.

A field-training course was conducted in areas contaminated by radioactive fallout. Information was acquired on methods of measuring and monitoring fallout with portable and laboratory equipment and on methods of decontamination from study and actual participation in the shots of Operation Plumbbob from April through June 29. Participation consisted in dry runs and actual runs under shot conditions. There were two types of runs. One consisted in the placement under fallout and later pick-up of fallout-collecting stations and -recording devices. The other consisted in the placement under fallout and later collection of foodstuffs. Each operation was followed by laboratory determinations of the amount of fallout contamination. Decontamination of the fallout-collecting stations was carried out to recover all the fallout material possible for further study. Decontamination of foodstuffs was carried out to test the feasibility of such types of operation only. (Author)

AD-611 239 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

McMaster Univ., Hamilton (Ontario).
MASS SPECTROMETERS AND ATOMIC MASS DETERMINATION.
Final rept. for 1 Oct 57-30 Sep 61,
by H. E. Duckworth. 30 Sep 61, 2p
Contract AF49 638 247
AFOSR 2341

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users ot DDC.
Copy is available for public sale.
See also AD-132 409, AD-136 694, AD-258 871.

Descriptors: (*Mass spectrometers, Nuclear physics), Atomic properties, Mass spectroscopy.

Investigation was conducted into: (1) Improvement in performance of the large double-focusing mass spectrometer; (2) Stopping power of materials for low energy positive ions; and (3) Ionization efficiencies of different elements in a spark source.

AD-611 240 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

Sandia Corp., Albuquerque, N. Mex.
SURFACE ALPHA MONITORING AS A METHOD OF MEASURING PLUTONIUM FALLOUT,
by R. E. Butler and H. M. Miller. Aug 61, 35p
WT 1513

Unclassified report

Rept. on Operation Plumbob, Nevada Test Site, May-Oct 57.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Health physics, Training), (*Plutonium, Radioactive fallout), (*Radioactive fallout, Alpha particle detectors), (*Alpha particle detectors, Radioactive fallout), Nuclear weapons, Detonations, Accidents, Radiation hazards, Monitors.

As one of a series of group efforts covering studies of radiation hazard resulting from one-point detonation of a weapon containing plutonium, this report gives a correlation as determined by chemical analysis of fallout between alpha survey meter readings and plutonium concentration in the immediate area of detonation. Results of determination of apparent decrease of surface contamination with time are presented. Also described is the training of personnel in the definition of radiation hazard following such accidental detonation. Maps of the test area show monitoring results in addition to isoconcentration contours. (Author)

AD-611 244 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

Federal Civil Defense Administration, Battle Creek, Mich.
EVALUATION OF AERIAL SURVEY METER V-780,
by Robert B. Martin. Nov 59, 38p
Proj. 70 1
WT 1721

Unclassified report

Rept. on Operation Hardtack, Apr-Oct 58.

Descriptors: (*Dosimeters, Airborne), Measurement, Dose rate, Performance (Engineering), Calibration, Test methods, Nuclear explosions, Radiological dosage.

This report describes a field evaluation of preproduction models of OCDM V-780 radiological survey instruments developed for aerial measurement of ground dose rate. Dose rates were measured by ground-survey teams along predetermined paths' these measurements were compared with corresponding measurements taken by aerial-survey teams. Correlation between the aerial- and ground-survey instrument readings varied up to factors of 10 to 1. The conclusion drawn from this test is that this instrument must undergo a major revision for civil defense application, both in basic design and in details of packaging and component selection. To the extent that the evaluation of the V-780 has been conclusive, the tests conducted in Project 70.1 were successful. (Author)

AD-611 245 Div. 20, 13
CFSTI Prices: HC$3.00 MF$0.75

Holmes and Narver, Inc., Los Angeles, Calif.
RADIATION SHIELDING AND RESPONSE STUDIES OF AEC TEST STRUCTURES,
by R. A. Cameron, Jr. and P. H. Huff. Jun 62, 56p
Proj. 34 2
WT 1723

Unclassified report

Rept. on Operation Hardtack, Apr-Oct 58.

Descriptors: (*Underground structures, Shielding), (*Radiological dosage, Underground structures), Dosimeters, Accelerometers, Nuclear explosions, Reinforced concrete, Gamma rays, Pressure, Explosion effects.

An investigation was made to determine the variation of the radiation dose in different positions inside four small shallow-buried reinforced-concrete test structures and to compare the accelerations inside two of these structures with the accelerations in the adjacent free field. Film badges, chemical dosimeters, and energy-dependent film badges were placed throughout all four of the structures. In addition, in two of the structures, a self-recording Ballistic Research Laboratories accelerometer was located in a corner on the floor. Two more accelerometers of the same type were located in the ground about 20 ft from the two stations. Even for the small structures considered in this test, considerable variation was observed in the radiation dose for the various locations in the structures. The average radiation readings in the structures were higher by a factor of about 3 than those predicted. The energy-dependent film badges, which also were strongly direction dependent, indicated that the radiation near the bottom of the structures was approximately isotropically distributed. However, calculated doses at individual badge locations based on the isotropic distribution did not agree well with observed doses. In all cases the peak accelerations recorded inside the shelters were higher than the corresponding free-field peaks. (Author)

AD-611 249 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

California Univ., Los Angeles.
CHEMICAL DOSIMETRY OF PROMPT AND RESIDUAL RADIATIONS FROM NUCLEAR DETONATIONS,
by George V. Taplin, Katharine H. Malin, Mary Lee Griswold and Donald E. Paglia. Jul 60, 34p
Proj. 37 5
WT 1493

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Health physics, Radiological dosage), (*Radiological dosage, Dosimeters), (*Dosimeters, Chemical indicators), Nuclear explosions, Radioactive fallout, Gamma emission, Radiation measurement systems, Feasibility studies.

Chemical dosimetry studies were made to estimate human exposures to prompt and residual radiations from nuclear detonations. They included measurements of: (1) gamma radiation from fallout at on-site and off-site areas; (2) air-dose and depth-dose distribution determinations in human phantoms placed at positions calculated to receive prompt neutron and gamma radiation exposures in the dose range of medical interest (0 to 1000 rads); and (3) estimates of gamma and mixed neutron plus gamma radiation exposures which might aid the evaluation of Japanese who survived prompt-gamma exposures at Nagasaki as compared with neutron plus gamma exposures at Hiroshima. The feasibility of using direct-reading chemical dosimeters for estimating gamma-ray exposures from nuclear fallout and from prompt bomb gamma radiations was demonstrated. In addition, the responses of single-phase dosimeters to gamma rays plus neutrons provided a useful index of the total exposure because they registered the gamma component accurately and also reflected the amount of associated slow- and fast-neutron radiations with sufficient accuracy (low by 10 to 25 per cent) to aid in the medical evaluation and initial segregation of radiation casualties.

AD-611 250 Div. 20, 16
CFSTI Prices: HC$6.00 MF$1.25

Defense Atomic Support Agency, Washington, D. C.
BIOLOGICAL HAZARDS.
1952, 220p
Proj. 2 4a
WT 372

Unclassified report

Rept. on Operation Jangle, Nevada Proving Grounds, Oct-Nov 51.

Descriptors: (*Nuclear explosions, Radiation hazards), (*Radioactive fallout, Beta particles), (*Gamma rays, Radiation hazards), (*Radiation injuries, Animals), Underground explosions, Radiation measurement systems, Ionization, Fission products, Dosimeters, Gamma-ray spectroscopy, Radiological dosage, Radiation effects, Tissues (Biology), Tables, Graphics.

Contents (Operation JANGLE: Underground nuclear explosion test):
Beta-ray and gamma-ray energy of residual contamination (WT-345)
Gamma depth dose measurements in unit density material (WT-332)
Gamma-ray spectrum of residual contamination (WT-348)
Biological injury from particle inhalation (WT-396)

AD-611 265 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Nuclear Defense Lab., Edgewood Arsenal, Md.
THE EFFECT OF NEUTRONS WITH ENERGIES ABOVE 6 MeV ON FISSION FOIL DATA,
by Jean Kappes and John H. McNeilly. Oct 64, 24p Rept. no. NDL-TR-46
Task A2 06 039

Unclassified report

Research sponsored by the Defense Atomic Support Agency, Washington, D. C.

Descriptors: (*Neutron detectors, Foils), (*Neutron flux, Measurement), Fission products, Nuclear cross sections, Uranium, Neptunium, Calibration.

The report describes a calculational correction to neutron-flux measurements that were made using fission foil detectors exposed to a radiation environment in which approximately 7.5 percent of all neutrons had an energy greater than 6 MeV. This investigation has shown that in many cases it will be necessary to correct the fission foil results because of the increased cross section at high neutron energies. In the particular example presented, where 7.5 percent of the total number of neutrons had energies greater than 6 MeV, the correction for U238 ranged between 21.9 and 27.3 percent and was marginal for Np237 (7.2 to 10.6 percent). Although corrections existed for the remaining foils, they

were all within the quoted experimental error of ±10 percent for the threshold detector system. The investigation describes an approach to the solution of the problem posed by high energy neutrons on threshold detector results, and emphasizes the fact that the problem must be considered in all future applications of this measurement technique. (Author)

AD-611 320 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

Federal Civil Defense Administration, Battle Creek, Mich.
CIVIL DEFENSE MONITORING TECHNIQUES,
by Fred R. Rehm, Carl A. Cinnamon, and Roscoe H. Goeke. Aug 56, 28p
Proj. 38 1
WT 1164

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.

Descriptors: (*Civil defense systems, Radiation monitors), (*Radiation monitors, Civil defense systems), Radioactive fallout, Radiation measurement systems, Airplanes, Vehicles, Attenuation, Time-lag theory, Feasibility studies.

Operations were conducted to obtain information by aerial, automotive, and ground monitoring surveys for the purpose of evaluating and correlating the data and methods. Studies were made to determine the attenuation factors of automobiles and airplanes and the time-lag factors of various instruments used in civil defense for the detection of radiation contamination. The results of the aerial survey were evaluated, and correlation factors were developed which permit the interpolation of aerial readings as ground-level radiation intensities within a range of ±50 per cent. Surveys conducted by automobile permitted the development of a set of correlation factors which can be used to compute dose-in-air readings for rapid automotive surveys. Radiation attenuation factors were developed for various aircraft and automotive vehicles. Time-lag factors (i.e., response time) were also developed for some of the civil defense instruments. The feasibility and practicability of automotive and aerial survey as a radiological monitoring tool was established. The practicability of the use of the SU-10A (civilian version of the military AN/PDR-T1B), which has been used for civil defense purposes as an interim aerial survey instrument, was established. (Author)

AD-611 362 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Syracuse Univ., N. Y. Dept. of Physics.
DOUBLE HYPERFRAGMENTS AND RELATIVE PARITY OF LAMBDA AND SIGMA HYPERONS,
by Syurei Iwao. 3 Feb 61, 19p
Contract AF49 638 801
AFOSR 177

Unclassified report

Descriptors: (*Hyperons, Parity), (*Parity, Hyperons), Sigma hyperons, Nuclear spins, Baryons, Pions, Energy, V particles.

A method for the determination of the relative parity of lambda and sigma hyperons is proposed. The possible bound states of the double hyperfragments are predicted from the parameters obtained before. If lambda-lambda interaction is attractive in the singlet S state, lambda and sigma will have the same parity; otherwise they will have opposite parity. (Author)

AD-611 375 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Syracuse Univ., N. Y. Dept. of Physics.
KINEMATICAL AND DYNAMICAL RESONANCES,
by A. O. Barut and K. H. Ruei. 1961, 10p
AFOSR 178

Unclassified report

Descriptors: (*Elementary particles, Resonance scattering), (*Resonance scattering, Elementary particles), Meson scattering, Mesons, Hyperons, Potential scattering, Resonance, Perturbation theory, Field theory.

In this note a method is given to characterize and distinguish the kinematical and dynamical resonances in the scattering of elementary particles by studying the resonance energy as a function of the coupling constant. The ambiguity of the solutions of the dispersion relations is resolved and the relation of the kinematical and dynamical resonances to bound states is discussed.

AD-611 379 Div. 20, 2
CFSTI Prices: HC$1.00 MF$0.50

Army Foreign Science and Technology Center, Washington, D. C.
DIURNAL CHANGES OF THE DUST CONTENT OF THE SURFACE LAYER OF THE ATMOSPHERE,
by K. P. Makhon'ko. Dec 64, 9p FSTC-381-T64-47
TT 65-61759

Unclassified report

Trans. from unidentified Russian source, p. 253-258.

Descriptors: (*Dust, Atmosphere), (*Atmosphere, Radioactive fallout), (*Radioactive fallout, Atmosphere), Micrometeorology, Radioactivity, Soils, Wind, Transport properties, Diurnal variations, Measurement, Simulation, Tracer studies, Instrumentation, USSR.

As a result of constantly acting wind erosion, radioactive fallout matter, together with soil particles, again enters into the atmosphere, increasing the concentration of radioactive dust in the air. In order to study certain details of this secondary process special model experiments are formulated for clarification of the diurnal variation of the fallout of virtually weightless dust, continuously forming on the underlying surface. The investigation was carried out by the labeled atoms method and conditions were created making it possible to exclude the distorting influence of global fallout. The fallout at a height of 1 m above the earth's surface was recorded automatically on sticky sheets. A simple apparatus with a clock mechanism which wound the sticky sheet at prescribed intervals was used. The experiments were made in the summer in a meadow with a well-developed grass cover.

AD-611 411 Div. 20, 2
CFSTI Prices: HC$1.50 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
MIGRATION OF FALLOUT AND FALLOUT SIMULANTS INTO SOILS.
Final rept. for May 62-Jul 64,
by Alfred E. Hanna. 24 Feb 65, 45p
Technical rept. no. R-362
Proj. Y F011 05 01 202

Unclassified report

See also AD-609 645.

Descriptors: (*Radioactive fallout, Soil mechanics), (*Soil, mechanics, Radioactive fallout), Health physics, Radio-

logical contamination, Simulation, Soils, Transport properties, Tracer studies, Lanthanum, Barium, Freezing, Melting, Penetration, Fission products, Test facilities, Cold weather tests, Experimental data.

A series of tests was performed to determine whether radioactive fallout would migrate vertically downward through soils. A thin layer of fused or leachable fallout simulant (Monterey sand coated with barium 140-lanthanum 140 or of natural fallout (fission products in soil) was spread on trays containing frozen soil mixtures. The trays were alternately thawed and allowed to refreeze, with radiation-level measurements made periodically. After a number of thaw-freeze cycles the frozen soils were vacuumed to remove surface activity. Core samples of the soils were taken and layers of the cores were counted to determine actual migration. It was concluded that migration did occur by leaching and particle movement, and that particle migration occurred only in soils having a wide range of particle sizes. A single vacuuming removed most of the detectable activity. (Author)

AD-611 457 Div. 20

California Univ., Los Angeles.
ON THE THEORY OF NUCLEAR REACTIONS.
Doctoral thesis,
by R. Lipperheide. 24 Jul 61, 46p
Contract AF49 638 717
AFOSR 2488 Unclassified report

Pub. in Annals of Physics (U. S.) v17 n1 p114-58 Jan 1962 (Copies not available to DDC or Clearinghouse customers).
Research supported in part by the National Science Foundation, Washington, D. C.

Descriptors: (*Nuclear reactions, Theory), (*N-body problem, Nuclear reactions), Quantum statistics, Quantum mechanics, Nuclear scattering, Potential theory, Nuclear particles, Hamiltonian.

A system of equations for the description of nuclear reactions is derived in which rigorous account is taken of the effects of the recoil of the target nucleus, the presence of hard cores in the two-body interactions, and the Pauli exclusion principle. The elastic and inelastic scattering processes are described in terms of 'equivalent potentials.' The relation between the equivalent potential in the elastic channel and the optical model potential is established. A self-consistent scheme for the approximate calculation of the phenomenological optical model potential is proposed. (Author)

21. Nuclear Propulsion

No Entries

22. Ordnance

AD-610 948 Div. 22, 26
CFSTI Prices: HC$2.00 MF$0.50

Aeroprojects Inc., West Chester, Pa.
SEALING OF PROPELLANT CONTAINERS BY ULTRASONIC WELDING, PHASE III.
Dec 64, 28p Research rept. no. 65-13
Contract DA36 034AMC0061A

Unclassified report

See also AD-605 394.

Descriptors: (*Containers, Ammunition propellants), (*Welding, Containers), (*Ultrasonic radiation, Welding), Aluminum alloys, Rings, Hermetic seals, Welds, Tests, Machines, Ammunition components.

Ultrasonic ring welding was successfully used to produce hermetic closures of propellant containers requiring formation of the welds in recessed cavities in the container bodies. The container body, Picatinny Ordnance Part No. XP-113711, was used without modification. The cover material was 0.005-inch-thick 3003-H19 aluminum alloy. After ultrasonic cleaning, the components were welded with a laboratory-type ultrasonic ring welding machine providing a power handling capacity of up to 10 kilowatts, modified to incorporate a special torsional coupling element, ring welding tip, and two-part welding anvil that provided a threaded receptacle for the container body. Representative assemblies, each filled with 65 grams of M10 propellant, were welded at 5400-watts electrical power, 1500-pounds clamping force, and 0.5-second weld time. Metallurgical evaluation indicated sound bonds, and hermetic sealing was verified by helium-leak and ethylene-glycol-submersion tests. Fifty such assemblies were delivered to Picatinny Arsenal for further evaluation. The process was considered applicable to production welding of these assemblies at rates substantially in excess of 1500 units per hour. (Author)

AD-611 001 Div. 22, 8, 25
CFSTI Prices: HC$3.00 MF$0.75

Naval Ordnance Test Station, China Lake, Calif.
DESIGN FOR A LASER RANGEFINDER.
Rept. for Jul 63-Jul 64,
by T. G. Bergman. Dec 64, 73p NOTS TP-3724
NAVWEPS 8674

Unclassified report

Masters' thesis.

Descriptors: (*Range finding, Lasers), (*Lasers, Range finding), Design, Small arms, Optical equipment components, Signal-to-noise ratio, Noise, Attenuation, Photomultifiers, Semiconductor devices, Power supplies, Light transmission, Portable.

In order to design a laser rangefinder, it is necessary to predict the effect that a change of any variables will have on the expected performance. Preliminary aspects of the overall design are discussed giving a general background in the current state of the art. A derivation of the relationship between the parameters in what is generally called the 'range equation' is shown. Methods for determining the parameters are presented and it is shown how the parameters affect the performance specification. The second half of the thesis computes the range equation and presents the design for a rifle rangefinder. The intent is to give a specific example for the material in the preceding discussion, and also to report on this design, which is being developed as a prototype model for military use. The rifle rangefinder is a portable instrument designed to be mounted on a rifle in place of the usual telescopic sight. It is extremely lightweight (less than 5 lb) and sets the rifle to the correct elevation semiautomatically. (Author)

AD-611 041 Div. 22, 9
CFSTI Prices: HC$4.00 MF$0.75

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SHOCK WAVES,
by A. S. Kompaneets. 12 Jan 65, 102p FTD-MT-64-232
TT 65-61709

Unclassified report

Edited machine trans. of mono. Udarnye Volny, Moscow, 1963, 92p.

Descriptors: (*Shockwaves, Fluid dynamic properties), (*Detonations, Shock waves), Explosions, Blast, Sound, Supersonic flow, Explosive materials, Nuclear explosions, Compressive properties, USSR.

Contents: What is gas dynamics, (sound waves, the appearance of an abrupt change, conditions at shock wave discontinuity, limiting compression in shock waves, weak shock waves, structure of front of shock wave); Actions of shock waves, (supersonic waves, shock waves during an explosion, reflection of shock waves, shock waves in laboratories and in the cosmos, shock waves in solid and friable bodies); Detonation, (detonation waves, limits of detonation, detonation of condensed substances, nuclear detonation).

AD-611 089 Div. 22
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
DISCOVERIES OF OUR DAYS, PANORAMA OF AN EXPLOSION,
by V. Gubarev. 22 Jan 65, 7p FTD-TT-64-885
TT 65-61723

Unclassified report

Unedited rough draft trans. from Komsomol'skaya Pravda (USSR) 1964, 10 May, p. 4.

Descriptors: (*Explosions, Theory), Detonations, Shock waves, Explosion effects, Combustion, Chemical reactions, USSR.

A nontechnical discussion is given of some characteristics and theories of explosions.

AD-611 172 Div. 22
CFSTI Prices: HC$6.00 MF$1.50

General Dynamics/Astronautics, San Diego, Calif.
INVESTIGATION FOR AN IMPROVED TECHNIQUE FOR THE ASSESSMENT OF MATERIALS REQUIREMENTS OF FUTURE WEAPONS SYSTEMS. PART I: DEVELOPMENT OF ANALYTICAL TECHNIQUES.
Summary technical rept. for Jul 62-Nov 63,
by W. H. Steurer and F. F. W. Krohn. Mar 64, 290p
Rept. no. GDA63-1214
Contract AF33 657 8925, Proj. 7381, Task 738104
ML TDR-64-94 Pt 1

Unclassified report

Descriptors: (*Systems engineering, Weapon systems), (*Weapon systems, Systems engineering), (*Materials,

Weapon systems), Military requirements, Supersonic planes, Transport planes, Aerospace planes, Analysis, Performance (Engineering), Structural parts, Mechanical properties, Alloys, Laminates, Adhesives, Graphite, Loading (Mechanics), Temperature, Costs, Design, Data.

This summary technical report delineates the development of an improved analytical method for the determination of systems performance gains resulting from materials improvements. The development was initiated by means of experimental systems analyses of a Supersonic Transport and an Aerospaceplane-type vehicle. Detailed accounts of these two systems studies are presented in Part II. This first part describes the development of an analytical technique and its individual procedures, supplemented by pertinent support information. (Author)

AD-611 227 Div. 22, 14
CFSTI Prices: HC$3.00 MF$0.75

Federal Civil Defense Administration, Battle Creek, Mich.
THERMAL IGNITION AND RESPONSE OF MATERIALS,
by Kyle P. Laughlin. Dec 57, 55p
Proj. 31 5
WT 1198

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.

Descriptors: (*Nuclear explosions, Thermal radiation), (*Thermal radiation, Nuclear explosions), Wood, Buildings, Textiles, Flammability, Plastics, Fuel tanks, Ignition, Thermal radiation, Protective coverings.

Six separate tests were conducted to measure the degree of damage to materials subjected to the thermal radiation of nuclear explosions. These tests are as follows: Stakeline test; treated-timber piling test; window protective test; fabrics test; oxyacetylene and flammable-liquid drum test; and plastics test.

AD-611 229 Div. 22, 2
CFSTI Prices: HC$3.00 MF$0.75

Sandia Corp., Albuquerque, N. Mex.
GROUND MOTION STUDIES AT HIGH INCIDENT OVERPRESSURE,
by William R. Perret. 20 Jun 60, 94p
Proj. 1 5
WT 1405

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Nuclear explosions, Seismology), (*Seismology, Nuclear explosions), Shock waves, Stresses, Airburst, Earth, Surface area, Acceleration, Motion, Measurement, Instrumentation.

Project 1.5 observed vertical and radial accelerations and vertical displacements produced in the ground by air shock from Shot Priscilla, which had an estimated yield of 37 kt, and a burst height of approximately 700 feet. Instrumentation was included to measure vertical acceleration at two depths in the vicinity of ground zero and both radial and vertical acceleration at the surface and at depths of 10, 30, 60, and 100 feet for pressure ranges of 270, 187, 120, and 59 psi. Vertical acceleration was observed at a depth of 200 feet at the 300-psi station. Relative displacements were measured between the surface and points roughly 10, 30, 60, 100, and 200 feet deep at each pressure range. Motion of three reinforced, cast-in-place, concrete piles extending from the surface to a depth of 100 feet, adjacent to the 187-and 120-psi free-field instrument stations, was studied by accelerometers near the top and bottom of each pile. Permanent ground displacement was observed by preshot and postshot first-order surveys of a series of monuments.

AD-611 230 Div. 22, 30
CFSTI Prices: HC$3.00 MF$0.75

Ballistic Research Labs., Aberdeen Proving Ground, Md.
INSTRUMENTATION OF STRUCTURES FOR AIR-BLAST AND GROUND-SHOCK EFFECTS,
by J. J. Meszaros, E. G. Schwartz, H. S. Burden, J. D. Day, and C. H. Hoover. Jan 60, 76p
Proj. 30 5
WT 1452

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.

Descriptors: (*Nuclear explosions, Explosion effects), (*Explosion effects, Recording systems), (*Recording systems, Explosion effects), Airburst, Surface area, Earth, Instrumentation, Photographs.

The objective was to provide instrumentation, electronic and self-recording, for obtaining air-blast and ground-shock loading and response of the structures employed by the various structures projects. Included was installation of transducers, recording of transducer signals, and presentation of the recordings as linearized time-dependent plots of the measured variable in the specified appropriate units. A total of 127 recording channels was utilized; of these channels, 75 were used for electronic recording on magnetic tape, 37 were used for self-recording time-dependent gauges, and 15 were peak-indicating gauges. A basic description of the instrumentation employed by the Ballistic Research Laboratories in taking the structural measurements for Projects 30.1, 30.2, 30.3, 31.4, and 31.5 is given. Self-recording gauges for measuring peak pressures, pressures vs. time, dynamic pressures vs. time, and displacement vs. time are described; electronic gauges for obtaining time-dependent records of pressure, dynamic pressure, acceleration, displacement, and earth pressure are described. For each type gauge, details are given on the recording mechanism, transducer element, gauge mount, calibration, and data presentation. A plot of the field layout is also shown. (Author)

AD-611 253 Div. 22, 6, 24
CFSTI Prices: HC$4.00 MF$0.75

Naval Ordnance Lab., White Oak, Md.
SHOCK WAVE PHOTOGRAPHY,
by J. F. Moulton, Jr. and E. R. Walthall. 1955
114p Rept. no. NOLR-1210
Proj. 1 2
WT 1102

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May, 1955.

Descriptors: (*Shock waves, Photography), (*Nuclear explosions, Photography), (*Photography, Nuclear explosions), Explosion effects, Airburst, Underground explosions, Recording systems.

The project was responsible for (1) determining the peak shock overpressure as a function of distance on Shot 10, the high-altitude shot; (2) studying the effects of the surface and the heating of the air near the surface on precursor formation, growth, and shock interaction for a number of yields and heights of burst over natural and artificial surfaces; and (3) ascertaining, prior to Shot 12, whether coalescence of the incident and reflected shocks could be expected to occur directly above the burst and, if so, determining the peak overpressure at given distances on that shot. Both smoke-grid photography and direct-shock photography, techniques similar to those used on previous tests, were employed in the successful accomplishment of these major objectives.

AD-611 254 Div. 22
CFSTI Prices: HC$2.00 MF$0.50

Sandia Corp., Albuquerque, N. Mex.
GROUND-LEVEL MICROBAROGRAPHIC PRESSURE MEASUREMENTS FROM A HIGH-ALTITUDE SHOT,
by J. W. Reed, J. R. Banister, and F. H. Shelton.
1955, 34p
Proj. 1 3
WT 1103

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 1955.

Descriptors: (*Nuclear explosions, High altitude), Explosion effects, Microbarometric waves, Acoustics, Measurement, Surface area, Earth.

Time records of incident and reflected overpressures from the high-altitude burst (Shot 10) of Operation Teapot were obtained at an array of ground stations. Modified Sachs' scaling to sea level for 1 kt gives overpressure results in agreement with an extension of the pressure-distance curve determined from canister data. Acoustic refraction did not appreciably alter the pressure-distance effects on this occasion. Shock-wave time parameters for this test were found to satisfy ordinary Sachs' scaling. An average pressure reflection factor of 0.92 was observed, but no correlation with surface parameters was obtained. (Author)

AD-611 255 Div. 22, 2
CFSTI Prices: HC$2.00 MF$0.50

Naval Radiological Defense Lab., San Francisco, Calif.
AIR TEMPERATURE MEASUREMENTS OVER SEVERAL SURFACES,
by E. C. Y. Inn. 1956, 42p
Proj. 8 4e
WT 1149

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.

Descriptors: (*Nuclear explosions, Atmospheric temperature), (*Atmospheric temperature, Nuclear explosions), Explosion effects, Atmosphere, High-speed photography, Gas analysis, Instrumentation.

Preshock air-temperature measurements in the vicinity of a nuclear detonation are reported. Although no data were obtained for close-in stations over water, asphalt, and desert, somewhat interesting but unusual results were obtained for stations of simulated terrain such as plots of ivy plants, fir boughs, wood, and concrete. The maximum air temperatures above ambient were found to be in excess of 1,500C over all plots. Furthermore, an increase in maximum air temperatures with elevation was found over all plots. Results of supporting high speed photographic coverage and gas analysis of air above irradiated plots are reported. An attempt to explain the results is given despite the lack of sufficient data. (Author)

AD-611 257 Div. 22, 20
CFSTI Prices: HC$4.00 MF$1.00

Stanford Research Inst., Menlo Park, Calif.
AIR-BLAST PHENOMENA IN THE HIGH-PRESSURE REGION.
1958, 132p
Proj. 1 3
WT 1403

Unclassified report

Rept. on Operation Plumbbob, Nevada Test Site, May-Oct 57.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Nuclear explosions, Pressure), (*Air-burst, Nuclear explosions), Atmosphere, Dust, Shock waves, High-pressure research, Instrumentation, Tables.

Surface level and aboveground static overpressures, near-surface differential pressures (pitot-tube), and near-surface total pressures were measured on a low-burst-height nuclear explosion (Shot Priscilla) 700 feet, 36.6 kt). Gages were placed at ground ranges from 450 feet to 4,500 feet, with a concentration of measurements in the high-pressure region. Blast switches, which measured arrival time only, were placed at several ranges, the closest at 100-foot range. Usable records were obtained on 39 of the 47 electronic channels. A precursor wave formed near 500-foot ground range, and dissipated between 2,000 and 2,500 feet. Shot Priscilla shock velocity agrees with the ideal except between 500- and 2,000-foot ranges where it exceeds the ideal. Computed preshock arrival surface temperatures are significantly higher than those computed for Shot 12, Operation Teapot. Differential pressure wave-form classifications based on the degree of deviation from the corresponding overpressure wave form indicates that at close-in scaled ground ranges total-head pressure wave forms follow fairly closely those of the overpressure. The greatest deviations are concentrated between 450 and 900 feet scaled ground range and 100 and 300 feet scaled burst height.

AD-611 274 Div. 22, 8, 26
CFSTI Prices: HC$3.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
RDT AND E COST ESTIMATING FOR AIRBORNE ELECTRONIC EQUIPMENT.
Master's thesis; Research paper,
by Keith A. Erikson. Aug 64, 64p
Rept. no. GSM/SM/64-6

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
Copy is available for public sale.

Descriptors: (*Electronic equipment, Airborne), (*Costs, Electronic equipment), (*Aircraft fire control systems, Costs), Weight, Management planning, Industrial production, Air force equipment, Reliability (Electronics).

This report is the result of an attempt to develop a methodology for estimating the costs involved in developing airborne electronic equipment. Although much of the report is general and, therefore, applicable to any class of airborne electronic equipment, the research effort itself was restricted to fire control equipments. All of the cost elements analyzed showa very marked trend of increasing with equipment weight. The trend is fairly consistent with the major exception of reliability costs. It is suspected that these costs are influenced to a high degree by the exact nature of the equipment involved. The required mean time between failures certainly has an effect upon this cost element although the exact nature of the effect is not evident from the data.

AD-611 321 Div. 22, 20
CFSTI Prices: HC$1.00 MF$0.50

Sandia Corp., Albuquerque, N. Mex.
MATERIAL VELOCITY MEASUREMENTS OF HIGH-ALTITUDE SHOT.
Final rept.,
by J. W. Reed, J. R. Banister, J. A. Beyeler, and F. H. Shelton. Jun 56, 22p
Proj. 1 9
WT 1108

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55. Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Shock waves, Measurement), (*Nuclear explosions, High altitude), (*Smokes, Shock waves), Particles, Velocity, Markers.

Smoke puffs were used in an attempt to measure behavior of the shock wave from Shot 10 at closer distances than those feasible for canister measurements. Errors in delivering the smoke puff canister placed the puffs outside the desired region and complicated the originally planned data reduction system. No significant conclusions may be drawn from the data because of excessive scatter. (Author)

AD-611 332 Div. 22
CFSTI Prices: HC$1.00 MF$0.50

Army Engineer Research and Development Labs., Fort Belvoir, Va.
KINETICS OF THE DISSOCIATION OF EXPLOSIVES,
by M. M. Pavlyuchenko. 1965, 10p
AERDL-T-1772-65
TT 65-61752

Unclassified report

Kinetika Razlozheniya Vzryvchatykh Veshchestv, trans. of Zhurnal Fizicheskoi Khimii (USSR) 1955, v. 29, no. 6, p. 996-1000.

Descriptors: (*Explosive materials, Reaction kinetics), (*Reaction kinetics, Explosive materials), Decomposition, Dissociation, Equations, USSR.

An equation describing the dissociation during the period of reaction acceleration was derived with the postulate that the reaction nuclei during the dissociation of explosives form as the result of the interaction of atoms or of radicals originating during the reaction with the molecules of the unreacted matter. The value for the exponent in the kinetic equation ($p = kt$ to the m power), once being applied to describe the dissociation rate of explosives, cannot be explained by the number of intermediate stages or the number of electrons necessary for the formation of a stable nucleus, as was considered by Mott (Proc. Roy. Soc. A, 172, 325, 1939), since the value of m depends on the degree of dispersion of the dissociating matter. Among the explosives discussed are the azides of lead, barium, calcium, and lead, and mercury fulminate.

23. Personnel and Training

AD-611 022 Div. 23, 28
CFSTI Prices: HC$2.00 MF$0.50

Aerospace Medical Research Labs. (6570th), Wright-Patterson AFB, Ohio.
TRAINING FOR CULTURE-CONTACT AND INTERACTION SKILLS.
Preliminary rept. for Feb 63-Aug 64,
by Donald B. Haines. Dec 64, 35p AMRL-TR-64-109
Proj. 1710, Task 171008

Unclassified report

Descriptors: (*Air force training, Social sciences), (*Military psychology, Air force training), (*Training devices, Air force personnel), Counterinsurgency, Social psychology, Culture, Language, Behavior, Electronic recording systems.

Air Force participation in counterinsurgency (COIN) and pre-COIN missions requires a new emphasis in preparing the airman. Success in COIN depends upon the ability of the USAF individual to interact effectively with people in other societies. The cross-cultural training required differs markedly from the traditional Air Force stress on the operation and maintenance of hardware. Many USAF training missions abroad are short in duration and depend upon close, intensive interaction between the American advisor and his counterpart. These requirements make it necessary for the American to establish rapport quickly and to communicate efficiently with his counterpart. Up to the present it was assumed if the American were skilled in his job and in the language of the host country that with the correct motivation he could successfully carry out his mission. Such is not the case; skill is also required in the other person's customs, habits, taboos, mannerisms, and gestures. Traditionally, the American is prepared for these by briefings or lectures sometimes called 'area studies'. Unfortunately, knowledge about behavior does not guarantee skill in carrying out that behavior-knowing what to do is not the same as doing what you know. This report outlines a procedure for collecting in the field those cross-cultural behaviors most critical for the success of the advisory mission. A means of categorizing these behaviors for incorporation into a training program is described. (Author)

AD-611 097 Div. 23, 30
CFSTI Prices: HC$2.00 MF$0.50

Coordinated Science Lab., Univ. of Illinois, Urbana.
THE USE OF AN AUTOMATIC COMPUTER SYSTEM IN TEACHING,
by P. G. Braunfeld and L. D. Fosdick. Sep 62,
36p R-160
Contract DA36 039SC85122, Task 3 99 01 002
N63 13814

Unclassified report

Descriptors: (*Education, Computers), (*Teaching machines, Programming (Computers)), Effectiveness, Students, Learning, Performance (Human), Cybernetics, Analysis.

PLATO II is an automatic teaching device designed to teach a number of students concurrently, but independently, by means of a single, central, high-speed computer. Only two student sites have been constructed thus far, but, in principal, the number of students that can be taught by PLATO II is limited only by the capacity and speed of the central computer. The power of such a computer-based teaching system stems from its ability to ask complex questions, judge the students' answers to these questions, and take an appropriate course of action on the basis of student responses. The computer also keeps detailed and accurate records of student performance, which are extremely useful guides to improving course content. The paper reports in some detail a study using PLATO II to teach nine undergraduate students a portion of a course on computer programming. Some analysis and interpretation of data gathered by the computer during the study are represented. The apparent effectiveness of PLATO II as a teacher, as well as the kinds of problems encountered in preparing lesson material for an automatic system, is discussed. (Author)

AD-611 107 Div. 23, 28
CFSTI Prices: HC$1.00 MF$0.50

Navy Experimental Diving Unit, U. S. Naval Station, Washington, D. C.
APTITUDE SELECTION STANDARDS FOR THE U. S. NAVY'S FIRST CLASS DIVING COURSE,
by D. A. Wise. 10 Jun 63, 14p
Research rept. no. RR-3-63
Proj. F011 06 01, Task 3361

Unclassified report

Descriptors: (*Naval personnel, Apptitude tests), (*Naval training, Diving), Military requirements, Selection, Correlation techniques.

A correlational analysis of 137 records of recent graduates and failures of the First Class Diver's Course was performed to determine what tests within the Navy's basic test battery--GCT, MECH, ARI, and CLER--could best be utilized as predictors of training success. As determined by a multiple correlation value of .428, the combination of ARI and MECH provided the best results. A combined cur-off score of 80 on these tests was suggested as a requirement for entrance in the First Class Diver's Course. (Author)

AD-611 125 Div. 23, 28
CFSTI Prices: HC$2.00 MF$0.50

System Development Corp., Santa Monica, Calif.
EXERCISING TEAMS IN MILITARY SYSTEMS THROUGH THE USE OF SIMULATION.
Professional paper,
by W. C. Biel, H. H. Harman, and M. S. Sheldon.
15 Oct 64, 46p SP-1739

Unclassified report

Descriptors: (*Military operations, Simulation), (*Management planning, Military training), (*Military training, Systems engineering), Military psychology, Military personnel, Personnel management, Decision making, Programming (Computers), Performance (Human).

Contents: Part I, Planning for Team Training in the System Development Process, by W. C. Biel, explains why analyses and decisions about training must be made early in the design of an operational system so that the types of training around which Parts II and III are focused can be well designed and ready when needed. Part II, Designing and Implementing the System Model, by H. H. Harman, details the design of team-training programs, and reports that this design follows analysis and planning. Part III, The Evaluation of Training in a Simulated Environment, by M. S. Sheldon, discusses problems associated with the evaluation of team training or system exercising. (Papers given at the session on 'Exercising the man in the system synthetically' of the meeting of the American Psychological Association held in Los Angeles, California, September 7-9, 1964)

24. Photography and Other Reproduction Processes

AD-610 989 Div. 24, 12
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
OPTICAL OBSERVATIONS OF THE ARTIFICIAL EARTH-SATELLITES,
by E. Z. Gindin, G. A. Leikin, A. M. Lozinskii, and A. G. Masevich. 23 Feb 65, 9p T-307-R
TT 65-61677

Unclassified report

Partial trans. of Predvaritel'nye Itogi Nauchnykh Issledovanii s Pomoshch'yu Pervykh Sovetskikh Iskusstvennykh Sputnikov Zemli i Raket, Sbornik State; (USSR) 1958, no. 1, pt. 1, p. 13-21.

Descriptors: (*Satellites (Artificial), Optical tracking), (*Tracking cameras, Satellites (Artificial)), Tracking telescopes, Astronomical cameras, Brightness, Oscillographs, USSR.

A camera equipped with a Boyer 'Saphir' objective (F=450 mm, D/F = 1:4.5), and with a chopper occulting the object, is being used to obtain a satellite trace exhibiting a number of interruptions which are recorded by means of an oscillograph. With a good ephemeris of predicted satellite positions, this camera makes it possible to achieve a precision of ± 1' and ± 0.05 sec. (Author)

AD-611 049 Div. 24
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command Wright-Patterson AFB, Ohio.
UNIVERSAL TYPE STEREOPHOTOGRAMMETRIC INSTRUMENT,
by F. V. Drobyshev. 28 Jan 65, 7p
FTD-TT-64-870
TT 65-61696

Unclassified report

Unedited rough draft trans. of Russian patent 158085, appl. no. 810527/26-10. 27 Dec 62.

Descriptors: (*Photogrammetry, Photographic equipment), (*Photographic equipment, Photogrammetry), Aerial photography, Camera lenses, Focusing, Photographic reconnaissance, Patents, USSR.

A sterophotogrammetric instrument for use in topographic analysis by aerial photography is described. The instrument is based on the principle of mechanical intersection, containing on-pedestal-mounted stationary photo-holders and a movable binocular observation system with sighting markers and coordinatograph. To assure constant image sharpness in the presence of angles of inclination in aerial photographs and to simplify construction of the instrument, segment-forming carriages with centers on the surface of the photos are placed between the photographs and the optical system. Holders of the objective lens are connected with the carriages of photo universal joints by levers, the length ratio of which is equal to the bundle transformation coefficient.

AD-611 333 Div. 24, 2
CFSTI Prices: HC$1.00 MF$0.50

Army Engineer Research and Development Labs., Fort Belvoir, Va.
EFFECT OF ENLARGEMENT OF A PHOTOGRAPHIC IMAGE ON SOME MEASURING PROPERTIES OF AERIAL PHOTOGRAPHS,
by V. F. Deineko. 1965, 12p AERDL-T-1774-65
TT 65-61754

Unclassified report

Vliyanie Uvelicheniya Fotoizobrazheniya na Nekotorye Izmeritel'nye Svoistva Aerosnimkov, trans. of Geodeziya i Kartografiya (USSR) 1964, no. 5, p. 42-48.

Descriptors: (*Aerial photographs, Photogrammetry), (*Photographic images, Aerial photographs), Photographic analysis, Projection printers, Aerial photography, Surveying, USSR.

An aerial photograph enlarged to the scale 1:M, and obtained from an aerial negative taken from a great height, in many respects has better measuring properties than does a contact print from an aerial negative taken directly in the scale 1:M from a lower height. It is more feasible for the contour and composite surveys to conduct the photographing from as great a height as possible, taking into account the maximum enlargement ratio at which a satisfactory photographic quality of the aerial negatives is obtained. It is possible to conduct aerial photographing to large and medium scales of surveying, figuring on a subsequent magnification of the aerial photographs by 4 - 8 times. In addition, in many cases, the various establishments can successfully utilize the already available aerial negatives from prior surveys with an enlargement of the photo-image by 3 - 4 times, and sometimes even more. The enlargement ratios will increase in value in proportion to the development of science and technology. The use in production of high enlargement ratios for a photo-image will permit us to raise appreciably the output and economy of the aerial photogeodetic operations in contour and composite surveying without a decrease in the accuracy of the maps and charts.

25. Physics

AD-610 828 Div. 25
CFSTI Prices: HC$6.00 MF$1.25

Electronic Properties Information Center,
Culver City, Calif.
GERMANIUM.
Data sheets,
by M. Neuberger. Feb 65, 240p DS-143
Contract AF33 615 1235, Proj. 7381, Task 738103
Unclassified report

Descriptors: (*Germanium, Single crystals), (*Single crystals, Germanium), Crystallography, Electrical properties, Optical properties, Conductivity, Magnetic properties, Transport properties, Luminescence, Absorption, Secondary emission, Thermionic emission, Life expectancy, Work functions, Impurities, Acoustic properties, Thermoelectricity, Electronics, Atomic energy levels, Graphics.

These data sheets present a compilation of a wide range of electrical, optical and energy values for pure and variously-doped germanium in bulk and film form. Electrical properties include conductivity, resistivity, dielectric constant, Hall coefficient, mobility, lifetime, thermoelectric and thermomagnetic effects. Emission data has been broken down into the varied electron and photon emissions which result from application of energy in the electromagnetic spectrum. Energy data include energy bands, energy gap and energy levels for variously-doped germanium, as well as, effective mass tables, work function, carrier diffusion and cross sections. The optical properties include absorption, reflection and refractive index. Other magnetic data and irradiation effects are included, as well as several bordering physical phenomena, such as piezoelectric properties, Debye temperature and thermal conductivity. Each property is compiled over the widest possible range of parameters from references obtained in a thorough literature search. A crystallographic summary has been added. (Author)

AD-610 846 Div. 25, 30
CFSTI Prices: HC$2.00 MF$0.50

Northeastern Univ., Boston, Mass.
MICROWAVE AND OPTICAL PLASMA DIAGNOSTICS.
Final rept. for 1 May 61-30 Nov 64,
by Theodore J. Morin, Jr. and George R. Peacock.
30 Nov 64, 41p
Contract AF19 604 8462, Proj. 4642, Task 464203
AFCRL 64 903 Unclassified report

Descriptors: (*Plasma medium, Analysis), (*Lasers, Interferometers), (*Interferometers, Plasma physics), Electrons, Density, Test methods, Theory, Instrumentation, Probes (Electromagnetic), Microwave equipment, Radio interferometers, Optical equipment.

The report describes the theory and some experiments involved in making electron density measurements. Microwave, and optical interferometric techniques are described in detail. Electrostatic probe theory is summarized in AD-288 643. The apparatus constructed to perform these measurements is also described in detail. Techniques are described for performing several electron density measurements simultaneously. The emphasis has been on microwave and optical methods, with single and double probes included only for substantiation. It is concluded that extremely passive type measurements, such as optical interferometric methods, in particular with the use of a laser as a light source will emerge as one of the most important plasma diagnostic techniques. (Author)

AD-610 856 Div. 25, 13, 14
CFSTI Prices: HC$2.00 MF$0.50

Columbia Univ., New York.
AXISYMMETRIC REINFORCED VISCOELASTIC CYLINDRICAL SHELL.
Technical rept. no. 26,
by M. Shinozuka and W. R. Spillers. Dec 64, 31p
Contract Nonr266 78, Proj. NR064 446
Unclassified report

Descriptors: (*Structural shells, Mechanical properties), (*Cylindrical shells, Mechanical properties), Viscoelasticity, Elastic shells, Reinforcing materials, Stresses, Strain (Mechanics), Mathematical analysis, Loading (Mechanics), Determination.

Available methods for determining the mechanical properties of a reinforced material in terms of the mechanical properties of the constituents are discussed. A solution is then presented to the problem of an axisymmetric thin cylinder formed by reinforcing a viscoelastic filler with elastic reinforcement. (Author)

AD-610 862 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Consiglio Nazionale delle Ricerche, Florence (Italy).
Centro di Studio per la Fisica delle Microonde.
THEORETICAL STUDY OF OPTICAL CAVITIES.
Final technical rept.,
by L. Ronchi, A. M. Scheggi, and G. Toraldo di Francia.
Jun 64, 22p
Contract AF61 052 536
AFCRL 64 1015
Unclassified report

See also AD-603 967.

Descriptors: (*Lasers, Cavity resonators), (*Diffraction gratings, Lasers), Mirrors, Mathematical analysis, Integral equations, Italy, Reflection, Light, Propagation.

A theoretical study is performed of the resonant modes of a laser cavity having end mirrors with periodic reflectivity. Two particular examples are examined: the case of end mirrors constituted by two identical strip diffraction gratings, and the case of end mirrors constituted by definite-ruling phase gratings. In the first example the modes and the corresponding eigenvalues are evaluated in successive approximations. It is found that a particular frequency exists for which losses are very low, while neighboring frequencies suffer heavy losses. This effect increases very rapidly with the total number of strips in the grating. In the case of phase gratings at transverse resonance the problem can be reduced to that of a resonator terminated by strip gratings. (Author)

AD-610 865 Div. 25
CFSTI Prices: HC$3.00 MF$0.75

Institute of Optics, Univ. of Rochester, N. Y.
A STUDY OF THE EMISSION FROM A TRAVELING WAVE RUBY LASER.
Master's thesis,
by Claude Benzing Smoyer. Nov 64, 85p
Contract AF19 628 2360 Unclassified report

Descriptors: (*Lasers, Line spectrum), Ruby, Emissivity, Diffusion, Interferometers, Optical phenomena, Electromagnetic waves, Magneto-optic effect.

Theoretical predictions have indicated that spectral narrowing of the emission from a ruby laser should

occur for a traveling wave laser cavity. Evidence of such spectral narrowing is presented. A comparison of equivalent traveling and standing wave cavities shows that for similar excitation, spectral narrowing of better than a factor of four can be achieved. However, multimoding in this experimental arrangement is still strongly evident. Results of preliminary experiments in 'Q' switching the traveling wave cavity are also presented. These results are inconclusive, but do show the need for a more sophisticated experimental procedure for obtaining optimum results from a 'Q' switched traveling wave laser cavity. (Author)

AD-610 877 Div. 25, 30
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
OSCILLOGRAPHIC STUDY OF DISCHARGE IN PULSED X-RAY TUBES,
by E. M. Reikhrudel', A. A. Sanin, and T. A. Titova.
Dec 59, 10p T-308-R
TT 60-22040 (Rev.)

Unclassified report

Trans. of Zhurnal Tekhnicheskoi Fiziki (USSR) 1951, v. 21, no. 7, p. 746-752.
Also available from NRC mi$0.50, ph$3.00 as NRC-C-3220.

Descriptors: (*X-ray tubes, Electric discharges), (*Electric discharges, X-ray tubes), (*Probes (Electromagnetic), Electric discharges), Oscillographs, Voltage, USSR, Electric current, Discharge tubes, Oscillation, Electrons.

The discharge in cold-emission pulsed X-ray tubes is studied at voltages of 100-300 kV. The research was conducted by means of a pulse oscillograph developed by the authors, with a driven sweep and a maximum recording speed of 40 cm/sec. The discharge-current oscillograms have disclosed oscillations of frequency = 10 megacycles per second, and a zone of retarded increase of the current (a 'step'). The effect of gas in the tube and that of the parameters of the system on the pulsed discharge are also discussed. (Author)

AD-610 879 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
X-RAY DIFFRACTION STUDIES OF THERMAL MOTIONS IN CRYSTALS.
Quarterly progress rept. no. 21, 1 Jun-31 Aug 64,
by R. A. Young. 6 Oct 64, 13p
Contracts Nonr99100, Nonr99106, Projs. NR017 623, A389

Unclassified report

This rept. includes Role of Thermal Motions in X-Ray Dynamical Theory Effects: I. Temperature Dependence of Bragg Intensity for Perfect Crystals in Bragg Geometry, by W. E. Krull and R. A. Young.
See also AD-439 003, AD-610 811.

Descriptors: (*Crystals, X-ray diffraction analysis), (*Thermal stresses, Crystals), (*Motion, Thermal properties), Crystal structure, Vibration, Temperature, Measurement, Materials, Silicon, Germanium, Polarization, Crystallography, Crystal lattices, Silver compounds, Chlorides.

The quarterly progress report contains an abstract for a paper on 'Lattice Vibrations in AgCl and the Temperature Dependences of X-ray Bragg Intensities,' by R. M. Nicklow and R. A. Young, to be presented at the Pittsburgh Diffraction Conference, November 1964. Also included is a foreword to the forthcoming Technical Report No. 3 that is essentially the Ph.D. thesis of Dr. R. M. Nicklow. TEMPERATURE DEPENDENCE OF BRAGG INTENSITY FOR PERFECT CRYSTALS IN BRAGG GEOMETRY: Experiments are under way for measuring the integrated intensity as a function of temperature (100 to 400K) and of the absolute value for 'g' with crystals as free as possible of all defects and strains, where 'g' is a zero parameter of an ideally perfect, non-absorbing crystal according to Parthasarathy (Acta Cryst. 13:802-806 (1960)).

AD-610 909 Div. 25, 17
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
HEAT-TREATMENT OF TWINNED IRON CRYSTALS,
by R. I. Garber, I. A. Gindin, M. G. Konstantinovskii, and V. I. Startsev. Nov 58, 5p T-260-R
TT 59-18686

Unclassified report

Trans. of Akademiya Nauk SSSR. Doklady, 1950, v. 74, no. 2, p. 343-344.
Also available from NRC as C-2979.

Descriptors: (*Iron, Crystal structure), (*Metallic crystals, Heat treatment), Recrystallization, Rupture, Stresses, Deformation, Thickness, USSR.

The work was undertaken to detect the removal of thin wedge-shaped twinned crystals in iron by heat treatment.

AD-610 945 Div. 25
CFSTI Prices: HC$4.00 MF$0.75

Ohio State Univ., Columbus. Dept. of Physics.
INTERNATIONAL CONFERENCE ON LOW TEMPERATURE PHYSICS (9th). PROGRAM AND ABSTRACTS.
Final technical rept. 31 Aug-4 Sep 64,
by J. G. Daunt. 25 Oct 64, 110p
Contract Nonr440900

Unclassified report

Descriptors: (*Cryogenics, Symposia), (*Symposia, Cryogenics), Low-temperature research, Superconductivity, Superconductors, Liquefied gases, Solidified gases, Transition elements, Metals, Hydrogen, Helium, Magnetism, Abstracting.

The program of the Ninth International Conference on Low Temperature Physics is presented along with the abstracts of papers presented thereat. Symposia were held on: superfluidity, superconductors, liquid helium, Fermi surfaces, low temperature transitions, quantum liquids, and dilute alloys with transition metals.

AD-610 946 Div. 25
CFSTI Prices: HC$2.00 MF$0.50

Yale Univ., New Haven, Conn. Observatory.
INTERACTION OF RADIATION AND MATTER IN A PLASMA.
Final technical rept. for Sep 61-Aug 64,
by Ludwig Oster. Nov 64, 48p
Contract AF33 657 7271, Proj. 7073, Task 707301
ARL 64-202

Unclassified report

See also AD-406 925.

Descriptors: (*Plasma physics, Electromagnetic waves), (*Electromagnetic waves, Electrons), (*Elec-

trons, Electromagnetic waves), Bremsstrahlung, Relativity theory, Perturbation theory, Magnetic fields, Electric fields, Plasma oscillations, Thermodynamics, Fourier analysis, Temperature, Density.

The following areas are treated: (1) The radiation spectrum emitted under the simultaneous action of Coulomb forces and an external magnetic field. (2) The radiation emitted by free particles in the neighborhood of the plasma frequency where the collective behavior of the plasma electrons becomes the dominant factor. (3) The radiative transfer problem in dispersive media which relates the observable spectrum of a plasma source to the internal parameters, such as temperature and density. (4) Departures from thermodynamic equilibrium in continuous energy states, when the radiative interactions can be separated from collisional transitions. (5) Relativistic corrections that turned out to be negligible under the conditions envisaged in the preceding paragraphs. (Author)

AD-610 953 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
IS LASER RADIATION CLASSICAL.
Memo rept.,
by Dennis Holliday and A. E. Glassgold.
Jan 65, 10p RM-4435-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Lasers, Electromagnetic waves), (*Electromagnetic waves, Lasers), Quantum mechanics, Statistical mechanics, Interference, Hamiltonian.

Considerable confusion and controversy exist in the literature over the nature of laser radiation. There are two opposing points of view, one supporting a classical, the other a quantum mechanical interpretation. In this report an attempt is made to resolve this issue by solving the quantum mechanical equations of motion for an ideal laser, and by using the concept of classical motion in quantum mechanics precisely. It is shown that the laser produces a classical field while undergoing linear self-amplification. The non-linear behavior which follows the linear amplification then leads to amplitude stabilization of this classical field; the phase of the field will be uniformly distributed.

AD-610 971 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
GROWTH AND COALESCENCE OF CRYSTALS UNDER THE INFLUENCE OF IONIZING RADIATIONS,
by M. L. Baskin and A. A. Semerchan. May 58, 4p
T-290-R
TT 59-15266

Unclassified report

Trans. of Akademiya Nauk SSSR. Vestnik, 1958, v. 28, no. 1, p. 69-70.

Descriptors: (*Crystal growth, Radiation chemistry), Electron beams, Beta particles, Ions, Ionization, X rays, Aluminum compounds, Oxides, Stresses, Diffusion, USSR.

Conclusions: In the formation of aluminum oxide crystals from metallic aluminum and oxygen, the oxygen, in spite of refrigeration, penetrates relatively quickly through the aluminum oxide layer to the metal. Irradiation increases the rate of diffusion. Irradiation with electrons and X rays at particle energies of the order of 1 Mev not only promotes the occurrence of all chemical reactions, but also increases the rate of diffusion and the rate of crystal growth.

AD-610 998 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Princeton Univ., N. J.
RESEARCH ON DIELECTRIC PROPERTIES AND THE STRUCTURE OF MATTER.
Quarterly status rept. no. 34, 1 Jul-30 Sep 64,
by Charles P. Smyth. 30 Sep 64, 4p
Contract Nonr185809, Proj. NR014 201

Unclassified report

See also AD-437 469.

Descriptors: (*Solid solutions, Dielectric properties), (*Dielectric properties, Solid solutions), Dipole moments, Solutions, Organic compounds, Polarization, Relaxation time, Molecular properties, Ethers, Molecular structure, Research program administration.

A Twin-T bridge was used to investigate the dielectric behavior of five solid solutions of n-dodecyl ether. {C12H25)2O, in n-hexacosane, C26H54, in the frequency range 0.6-30 mc. An RX meter was being used to measure solid solutions of lauryl laurate, C12H25CO2C11H23, in hexacosane in the range 0.5-250 mc. The variety of solid phases encountered complicates the behavior observed. Preliminary measurements on benzophenonetetrahydrofurane mixtures could be analysed in terms of two relaxation times. To investigate the simple dipolar mixtures further, mixtures of 2-chloronaphthalene in pyridine, 4-iodobiphenyl in chloroform, benzophenone in pyridine, and benzophenone in chloroform were measured at wave lengths of 575 m, 10 cm, 3.2 cm, 1.2 cm, and 2.2 mm. The dispersion region of each mixture could be represented by superposition of two Debye relaxation processes with the relaxation times. The larger relaxation time characterises the orientation of the solute molecule and the smaller the orientation of the solvent molecule. The relative weights of the two dispersion regions were proportional to the square of the dipole moment and the number of molecules of the respective components present.

AD-610 999 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Princeton Univ., N. J.
RESEARCH ON DIELECTRIC PROPERTIES AND THE STRUCTURE OF MATTER.
Annual summary rept. for 1 Oct 63-30 Sep 64,
by Charles P. Smyth. 30 Sep 64, 6p
Contract Nonr185809, Proj. NR014 201

Unclassified report

See also AD-437 469.

Descriptors: (*Liquids, Molecular properties), Dielectric properties, Solid solutions, Solid state physics.

AD-611 015 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
COMPUTATION OF THE PARAMETERS OF THE LOW-PRESSURE PLASMA IN NEON,
by N. V. Basova, A. M. Devyatov, G. S. Solntsev, and P. I. Skvortsov. 2 Feb 65, 10p FTD-TT-64-838
TT 65-61674

Unclassified report

Unedited rough draft trans. of Moscow Univ. Vestnik. Seriya 3: Fizika, Astronomiya (USSR) 1963, v. 18, no. 2, p. 37-42.

Descriptors: (*Plasma medium, Electrical properties), (*Neon, Plasma physics), Gas discharges, Optical properties, Electric fields, Gas ionization, Thermodynamics, Low-pressure research, Plasma oscillation, USSR.

On the basis of the theory of B. N. Klyarfel'd there was computed the values of the number of electrons per unit of length of the column, the electron temperature, and the longitudinal gradient of the electrical field in a discharge with an incandescent cathode in neon with pressures of 0.02--0.2 mm of Hg column taking into account the losses in energy through radiation. Comparison of the results of the computations with the results of the probe measurements shows satisfactory agreement between them. (Author)

AD-611 030 Div. 25
CFSTI Prices: HC$2.00 MF$0.50

Emmanuel Coll., Boston, Mass. Research Language Center.
COHERENCE PROPERTIES OF ELECTROMAGNETIC RADIATION,
by Chih-chiang Wang. May 64, 46p E-T-Ch-64-12
Contract AF19 628 3869
TT 65-61681 Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) 1963, v. 19, no. 5, p. 320-335.

Descriptors: (*Electromagnetic waves, Coherent scattering), (*Coherent scattering, Electromagnetic waves), Light, Interference, Intensity, Statistical functions, Quantum mechanics, Bosons, Interferometers, China.

This paper primarily discusses recent progress in research dealing with coherence properties of electromagnetic radiation. Using the concept of photon degeneracy and the degree of coherence, problems such as interference, intensity fluctuations and the properties of coherent light sources are explained. Since the radiation process is random, the intensity of the signal generated by the interference of different sources can be determined by the correlation of radiation processes as derived in this paper. Treating photons as bosons, the phenomenon 'intensity interference' is explained as quantum fluctuations. Thus, the coherence properties of radiation may well be interpreted from the basic concept of quantum mechanics. (Author)

AD-611 035 Div. 25

Emmanuel Coll., Boston, Mass. Research Language Center.
ANTI-WAVEGUIDE PROPAGATION IN A HETEROGENEOUS LAYER,
by Erh-ch'ang Shang. Jun 64, 24p E-T-Ch-64-15
Contract AF19 628 3869
TT 65-61704 Unclassified report

Trans. of Wu Li Hsueh Pao (Chinese People's Republic) 1961, v. 17, no. 4, p. 180-190.
Available only for reference use at DDC Field Services. Copy is not available for public sale.

Descriptors: (*Mechanical waves, Propagation), (*Acoustics, Propagation), Boundary value problems, China.

This paper examines the field of a point radiator in a heterogeneous layer in which there is no shear elasticity and the parameter of the medium is a linear function, given H/lambda >> 1, where H is the thickness of the layer, and lambda, the wavelength. It studies theoretically three types of anti-waveguide propagation not formed by total reflection of the boundary surface. A beam interpretation is obtained in the Wentzel-Kramers-Brillouin approximation for the dispersion equation for normal waves. A formula is given for the field intensity in the effective shadow when the boundary condition is described by the numerical coefficient of reflection. (Author)

AD-611 039 Div. 25, 8, 26
CFSTI Prices: HC$2.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
RESEARCH ON HETEROJUNCTIONS (GROWTH OF GALLIUM PHOSPHIDE SILICON HETEROJUNCTIONS). PART I.
Technical rept.,
by James S. Kesperis, Robert S. Yatsko, and Phillip A. Newman. Jun 64, 39p Technical rept. ECOM-2471
Proj. 1P622001A056, Task 1P622001A05601 13
Unclassified report

Descriptors: (*Semiconductors, Preparation), (*Silicon, Semiconductors), (*Gallium compounds, Epitaxial growth), (*Epitaxial growth, Gallium compounds), Phosphides, Single crystals, Vapor plating, Oxides, Phosphorus compounds, Chlorides, X-ray diffraction analysis, Photoelectric effect, Capacitance, Diodes (Semiconductors).

The report is a summary of experimental progress in continuing research with new semiconductor materials and devices. Specifically described is the investigation of epitaxial techniques for the growth of gallium phosphide on silicon. Open-tube vapor phase transport methods using the reaction of gallium oxide with red phosphorus yield large amounts of vapor grown GaP, but are found to be incapable of producing epitaxial layers on silicon. Similar techniques using PC13 and metallic gallium as the reactants yielded GaP overgrowths on silicon shown by Xray diffraction to be single crystal. Heterojunctions of GaP on 5-ohm cm P-type exhibit photovoltages of 0.17 volts and barrier heights by capacitance measurement of 0.13 volts. (Author)

AD-611 040 Div. 25, 19, 31
CFSTI Prices: HC$7.05 MF$2.00

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THEORY OF GYROSCOPIC INSTRUMENTS,
by B. I. Kudrevich. 24 Nov 64, 402p FTD-TT-63-1100
TT 65-61708 Unclassified report

Unedited rough draft trans. of mono. Teoriya Giroskopicheskikh Priborov, Leningrad, 1963, 328p (Kudrevich, B. I. Izbrannye Trudy, v. 1).

Descriptors: (*Gyroscopes, Motion), Theory, USSR, Gyro stabilizers, Moments, Momentum, Shipborne, Airborne, Velocity, Mathematics.

Contents: The gyroscope and the basic equations used to study it; Investigation of the motion of a gyroscope with three degrees of freedom; Fundamentals of pendulum-inclinometer theory; Theory of undamped vertical-gyroscope oscillations; Theory of damped vertical-gyroscope oscillations; Fundamentals of vertical-gyroscope theory for a spherical gyroscope; Fundamentals of vertical-gyroscope theory in the presence of a pendulum air-jet correcting device; Fundamentals of free-oscillation theory for compound gyroscopic pendulums; Transformation of coordinates on board ship; Gimbal geometry; Fundamentals of the theory of force gyrostabilizers; Gyroscope angular-velocity indicator; Directional gyroscopes.

AD-611 060 Div. 25,4,9,27
CFSTI Prices: HC$3.00 MF$0.75

Gas Turbine Lab., Mass. Inst. of Tech., Cambridge.
CONDENSATION OF AMMONIA VAPOR DURING RAPID EXPANSION,
by Michael Kremmer and Olufemi Okurounmu.
Jan 65, 75p Report no. 79
Contract Nonr396307

Unclassified report

Descriptors: (*Ammonia, Condensation), (*Nucleation, Vapors), Drops, Supersonic nozzles, Surface tension, Pressure, Temperature, Stagnation point, Distribution, Theory.

The report presents an experimental study, through pressure distributions, of the homogeneous nucleation and condensation of initially super-heated ammonia vapor during its expansion in a low Mach number supersonic nozzle. The results of the experiments are compared with the classical nucleation theory of Becker and Doring or Frenkel-Zeldovich, on the basis of the predicted pressure and temperature at which condensation would occur starting from a given stagnation condition. It is found that ammonia shows far less supersaturation than this theory predicts. The effect of arbitrary corrections to the surface tension showed that a further reduction in surface tension of the drop relative to the flat-film value gives better agreement between measured and predicted pressure distributions. Even better agreement is obtained without a surface tension correction if we assume that the nucleation rate is greater by a factor of 10 to the 17th power. (Author)

AD-611 062 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Microwave Lab., Stanford Univ., Calif.
ENERGY TRANSFER IN SOLID LASER MATERIALS.
Technical summary rept. no. 1, 1 May-31 Jul 64,
by A. L. Schawlow. Aug 64, 9p Rept. no. ML-1211
Contract Nonr22578, ARPA Order 306 64

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Lasers, Energy), (*Ruby, Excitation), (*Lanthanum compounds, Fluorides), Ultraviolet radiation, Atomic energy levels, Absorption spectrum, Ions, Fluorescence, Impurities, Rare earth elements.

Investigations in the following areas are summarized: ultraviolet excitation of ruby (nature of the excited states in ruby, energy transfer between levels and between ions in ruby); energy transfer between unlike ions in lanthanum flouride.

AD-611 064 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Pennslyvania Univ., Philadelphia.
FERROMAGNETIC THEORY
Annual summary rept.,
by Herbert Callen. Oct 64, 7p
Contract Nonr55136

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Ferromagnetism, Theory), Antiferromagnetism, Magnetostriction, Ferromagnetic materials, Impurities, Phase studies, Statistical mechanics.

In summarizing the year's work, listings are given of: (1) Publications that have appeared during the year; (2) Publications in press; (3) Technical reports distributed, and (4) Personnel. Summaries are included of the following works in progress: Statistical mechanics of the Heisenberg antiferromagnet; Magnetostriction and magnetoelastic coupling; Properties of the ferromagnetic phase transition; Theory of excitons in molecular crystals; and Impurity levels in ferromagnets.

AD-611 065 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Minnesota Univ., Minneapolis.
STUDY OF COLLISION PROCESSES IN GASEOUS PLASMAS.
Annual Summary rept. 1 Oct 63-1 Oct 64,
by H. J. Oskam. 1 Oct 64, 9p
Contract Nonr71037, Proj. NR012 206

Unclassified report

Descriptors: (*Plasma medium, Gases), Plasma physics, Ions, Mass spectroscopy, Vacuum, Time, Light, Excitation, Atoms, Gas ionization, Recombination reactions, Measurement.

The studies were started in 1958 with the measurement of the time dependence of the number density of electrons in decaying plasmas and have been extended by studying the properties of ions, mtastable atoms, etc. This investigation is directed towards (1) the relation between the values of the mobility of positive ions as obtained from time-of-flight studies and those calculated from ambipolar diffusion coefficients measurements. (2) The study of the mechanism of electron-positive ion and negative ion-positive ion recombination, combined with the measurement of the reaction rates involved. (3) The production processes and properties of homonuclear and heteronuclear polyatomic ions. (4) The study of the origin of light omitted by a decaying plasma. (5) The study of the properties of metastable excited atoms. The equipment being used for the studies described has been designed and constructed with the goal of measuring simultaneously the properties of as many plasma constituents as possible.

AD-611 075 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
DEPENDENCE OF ELECTRODE EROSION UPON FORM OF CURRENT PULSE,
by A. I. Kruglov and V. N. Fukin. 28 Jan 65, 16p
FTD-TT-64-857
TT 65-61689

Unclassified report

Unedited rough draft trans. of mono. Elektroiskrovaya Obrabotka Metallov, Moscow, 1963, p. 29-37.

Descriptors: (*Electrodes, Erosion), (*Electric currents, Erosion), (*Erosion, Electrodes), Electromagnetic pulses, Anodes, Cathodes, Waveform generators, USSR.

A study is made of the erosion characteristics of metals as affected by pulsed low voltage discharges in a liquid dielectric. The optimum current pulse form is sought.

AD-611 080 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
THE EARTH-UNIVERSE HIGHWAY,
by D. V. Skobel'tsynym. 29 Jan 65, 7p
FTD-TT-64-984
TT 65-61692

Unclassified report

Unedited rough draft trans. from Trud, Moscow (USSR) 1964, no. 25, 30 Jan, p. 3.

Descriptors: (*Quantum mechanics, USSR), Solid state physics, Lasers, Semiconductor devices, Oscillators, Telescopes, Radio astronomy, Theory, Reviews.

Brief review of Russian accomplishments in quantum electronics.

AD-611 102 Div. 25, 4, 14
CFSTI Prices: HC$2.00 MF$0.50

Air Force Materials Lab., Air Force Systems Command Wright-Patterson AFB, Ohio.
THE EFFECT OF CHEMICAL COMBINATION ON K X-RAY EMISSION SPECTRA FROM MAGNESIUM, ALUMINUM AND SILICON.
Summary rept. for Oct 63-Oct 64,
by William L. Baun and David W. Fischer. Dec 64, 38p ML TR-64-350
Proj. 7367, Task 736702

Unclassified report

Descriptors: (*Magnesium, X-ray spectrum), (*Aluminum, X-ray spectrum), (*Silicon, X-ray spectrum), (*X-ray spectroscopy, Line spectrum), Magnesium compounds, Aluminum compounds, Silicon compounds, Intermetallic compounds, Oxides, Emissivity, Intensity, Complex compounds, Phase studies, Chemical bonds.

Wavelength and intensities are reported for the K series of Mg, Al, and Si using primary excitation. Spectra are shown and line positions and intensities are detailed using both metal and oxide as the X-ray source. Significant differences are seen between metal and oxide spectra especially in wavelength and shape of K-beta and large changes are noted in the intensities of some satellite lines. Spectra from a number of aluminum intermetallic compounds are discussed including line positions, satellite line ratios and line shape. It is shown that the spectra fall into three predictable groups, for example, good conductors, poorer conductors, semiconductors and insulators. Structurally similar compounds give similar spectra. For instance, line positions, shapes and intensities are nearly identical for NbAL3 and TaAl3. It is not possible to correlate spectra with aluminum coordination number and previous work using K-alpha where secondary excitation was used could not be reproduced using primary excitation. Possible reasons for this disagreement are discussed. K-beta from both solid and molten aluminum is shown and a theory of structure in liquid metals is discussed based on changes observed between solid and liquid spectra. Data for a series of silicon compounds are shown and the results compared to aluminum. (Author)

AD-611 127 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Avco-Everett Research Lab., Everett, Mass.
RADIATION FROM A GAS CONTAINING ALKALI METAL VAPORS,
by Robert H. Thomas. Jan 65, 23p AMP-152
Contract AF04 694 414
BSD TDR-64-164

Unclassified report

Descriptors: (*Plasma medium, Line spectrum), (*Line spectrum, Alkali metals), (*Alkali metals, Plasma medium), Electromagnetic waves, Resonance, Spectroscopy, Helium group gases, Excitation, Solar atmosphere, Energy.

This report derives an approximate analytic expression for the radiant energy flux from a plasma contained in an infinite plane parallel enclosure. (Author)

AD-611 128 Div. 25, 30
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., Schenectady, N. Y.
ELECTRON TIME OF FLIGHT SPECTROMETER.
Annual summary rept. no. 2 for the period ending 30 Sep 64,
by G. C. Baldwin. 28 Oct 64, 4p
Contract Nonr394200, Proj. NRNO 012117

Unclassified report

See also AD-421 953.

Descriptors: (*Electrons, Spectrum analyzers), (*Spectrum analyzers, Electrons), (*Velocity, Selection), Spectroscopy, Time, Probability, Gases, Deflection, Electron beams, Scattering, Measurement.

The work to date has shown that the principle of velocity selection by time-of-flight measurement is applicable to slow electrons. Energies below 0.25 volt have been detected, and there seems to be hope that this can be extended downward by at least a factor of 5. The present limits are set by practical problems of shielding, light source duration, interactions of the sample gas with emitter and detector surfaces and contact emf changes. The accuracy of measuring cross sections will be limited mainly by the pressure measurement technique and the interactions of the sample gases with surfaces in the spectrometer. This spectrometer can be adapted with relatively minor changes to studies of electron reflection, of secondary emission, photoelectric spectra, adsorbed films, and surface states of solids.

AD-611 133 Div. 25,20
CFSTI Prices: HC$3.00 MF$0.75

Michigan Univ., Ann Arbor. Coll. of Literature, Science and the Arts.
HIGH ENERGY NEGATIVE PION + p ELASTIC SCATTERING FOR SMALL MOMENTUM TRANSFERS AND FORWARD DISPERSION CALCULATIONS.
Doctoral thesis,
by Howard I. Saxer. Dec 64, 92p
Technical rept. no. TR-19, 03106-19-T
Contract Nonr122423, Proj. 03106

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.

Descriptors: (*Pions, Elastic scattering), (*Proton scattering, Pions), Nuclear cross sections, Nuclear scattering, Momentum, Protons, Nuclear reactions, Radiation measurement systems.

The negative pion-proton elastic differential cross section was measured at incident pion momenta of 2.01,

3.15, 4.13, and 4.95 BeV/c for the range of the square of the four momentum transfer of .0008 < or = absolute valued t < or = .154 (BeV/c) sq. The data extended into the region where Coulomb scattering contributions were significant. Experimental values for the real part of the forward nuclear scattering amplitude were calculated using a simple interference model for Coulomb nuclear interaction. The best values found are consistent with dispersion theory predictions in that the sign is negative, indicating destructive interference. Forward dispersion relation calculations were carried out for pion kinetic energies of 1 to 29 BeV using recent pion (±) + p total cross section results. (Author)

AD-611 134 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Michigan Univ., Ann Arbor. Coll. of Literature, Science, and the Arts.
STRONG LUMINOUS SHOCKS PRODUCED IN SHOCK TUBES.
Final rept.,
by C. W. Mautz and O. Laporte. Nov 61, 3p
Rept. no. 02822-4-F
Contract AF49 638 439, Proj. 02822
AFOSR 1803

Unclassified report

See also AD-262 100.

Descriptors: (*Shock tubes, Atomic spectroscopy), (*Atomic spectroscopy, Shock tubes), Atomic energy levels, Shock waves, Luminosity, Chromium.

A summary of research in shock tube spectroscopy is provided. The work has proved the value of the shock tube as a source for spectroscopic measurements, and has established a new technique for measuring absolute valves of atomic transition probabilities.

AD-611 144 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Ecole Normale Superieure, Paris (France).
CRITICAL POINTS OF THE FREQUENCY SURFACES IN THE SILICON CRYSTAL,
by M. Balkanski, W. Nazarewicz, and E. Da. Silva.
15 Sep 63, 24p Technical note no. TN-1
Contract AF61 052 572
AFOSR 5429

Unclassified report

See also AD-611 145.

Descriptors: (*Silicon, Radiation damage), (*Crystal lattices, Silicon), (*Phonons, Absorption), (*Absorption spectrum, Silicon), Infrared spectroscopy, Fast neutrons, Crystal lattice defects, Vibration, France, Crystals, Polarization, Optical properties.

The one-phonon and two-phonon infra-red absorption spectrum (10-130 microns) in silicon crystals reveals a structure due to Van HOVE's critical points for frequency surfaces. From the experimental data it is possible to obtain the precise values of phonon energies for the various branches of the frequency spectrum at the following points in the reduced zone: Gamma (0, 0, 0), X(1, 0, 0), L(1/2, 1/2, 1/2), W(1, 1/2, 0) and Sigma (3/4, 3/4, 0). These results agree with a set of critical points for the symmetry properties established on the basis of theoretical, topological and group considerations. (Author)

AD-611 145 Div. 25, 20
CFSTI Prices: HC$1.00 MF$0.50

Ecole Normale Superieure, Paris (France).
SINGLE PHONON ABSORPTION BANDS IN FAST NEUTRON IRRADIATED SILICON,
by M. Balkanski and W. Nazarewicz. 15 Sep 63, 18p
Technical note no. TN-2
Contract AF61 052 572
AFOSR 5430

Unclassified report

See also AD-611 144.

Descriptors: (*Silicon, Radiation damage), (*Absorption spectrum, Silicon), (*Phonons, Absorption), Infrared spectroscopy, Fast neutrons, Photons, Excitation, Crystal lattice defects, Vibration, Crystals, Neutron scattering, Optical properties, France, Polarization.

Theoretical considerations on the photon phonon interaction and experimental results concerning fast neutron irradiated silicon have been presented. The infrared absorption spectrum contains absorption bands at 488, 417, 332, and presumably at 140/cm attributed to a single phonon absorption process connected with the excitation of the fundamental modes, TO, LO, LA, and TA, respectively. These fundamental modes become active because of the lattice polarization bombardment. (Author)

AD-611 146 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Ecole Normale Superieure, Paris (France).
STUDY OF THE OPTICAL PROPERTIES OF HIGHLY DOPED AND DEGENERATE SILICON,
by M. Balkanski and J. M. Besson. 15 Oct 63,
18p Technical note no. TN-5
Contract AF61 052 572
AFOSR 5437

Unclassified report

See also AD-611 195

Descriptors: (*Silicon, Crystals), (*Absorption spectrum, Silicon), Impurities, France, Optical properties, Polarization, Phonons, Infrared spectroscopy, Scattering.

An investigation was made of the free carrier absorption, the absorption peak at 2.3 microns, and the energy shift of the fundamental absorption edge. The 2.3 microns peak was attributed to intraband transition. (Author)

AD-611 147 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Harvard Univ., Cambridge, Mass. Div. of Engineering and Applied Physics.
PRESSURE DEPENDENCE OF THE ELECTRICAL AND OPTICAL PROPERTIES OF SEMICONDUCTORS.
Progress rept. no. 32.
Aug 64, 20p
Contract Nonr186610

Unclassified report

See also AD-437 479.

Descriptors: (*Semiconductors, Pressure), Optical properties, Electrical properties, Lead compounds, Salts, Tin, Mercury compounds, Tellurides, Selenides, Band spectrum, Intermetallic compounds, Nuclear spins, Nuclear resonance, Transition elements, Oxides, Magnesium compounds, Silicates, Magneto-optic effect, Semiconducting films, Germanium, Sulfides, Cadmium compounds, Absorption spectrum.

Topics include: optical and electrical properties of

lead salts under pressure; electrical properties of gray tin as a function of pressure and band structure studies of HgSe and HgTe; effect of pressure on the properties of intermetallic crystals; spin resonance measurements on semiconductors; investigation of the properties of the transition metal oxides; construction and application of a new ratio type spectrometer for the measurement of small increments in absorption coefficients; investigation of the semiconducting properties of forsterite; investigation of the Faraday rotation in semiconductors; investigation of the optical properties of Ge, PbS, CdTe, and HgTe thin films; the effect of pressure on the spontaneous and stimulated radiative recombination spectrum of intermetallic compounds.

AD-611 165 Div. 25, 14, 17
CFSTI Prices: HC$6.00 MF$1.50

Martin Marietta Corp., Denver, Colo.
CRYOGENIC MATERIALS DATA HANDBOOK.
Progress rept. no. 1,
by F. R. Schwartzberg, S. H. Osgood, R. D. Keys, and T. F. Kiefer. Feb 65, 260p
Contract AF33 657 9161, Proj. 7381, Task 738106
ML TDR-64-280 suppl.; PB 171 809 Rev. suppl. 1
Unclassified report

See also AD-609 562.

Descriptors: (*Handbooks, Cryogenics), (*Cryogenics, Materials), (*Titanium alloys, Cryogenics), (*Aluminum alloys, Cryogenics), (*Stainless steel, Cryogenics), (*Alloys, Cryogenics), (*Plastics, Cryogenics), Physical properties, Mechanical properties, Loading (Mechanics), Thermal expansion, Tin alloys, Molybdenum alloys, Vanadium alloys, Niobium alloys, Tantalum alloys, Zirconium alloys, Chromium alloys, Nickel alloys, Cobalt alloys, Steel, Copper alloys, Beryllium alloys, Brass, Nylon, Halocarbon plastics, Epoxy plastics, Phenolic plastics, Polyester plastics, Silicone plastics, Glass textiles, Filament wound construction.

The completely revised 'Cryogenic Materials Data Handbook' presently contains mechanical and physical property data on 62 metallic and nonmetallic materials organized in eight sections. The Handbook also contains material, property, and accumulative indices and reference list. Progress reports to update and maintain the Handbook will be issued semiannually. (Author)

AD-611 166 Div. 25
CFSTI Prices: HC$2.00 MF$0.50

General Telephone and Electronics Labs., Inc., Bayside, N. Y.
LOW VOLTAGE DC LUMINESCENCE.
Final rept., for 26 Mar 63-25 Mar 64,
by R. N. Summergrad and M. S. Wasserman. Dec 64, 44p
Contract AF30 602 2997, Proj. 5578, Task 557803
RADC TDR-64-276
Unclassified report

Descriptors: (*Semiconductors, Electroluminescence), (*Electroluminescence, Semiconductors), (*Display systems, Electroluminescence), Gallium alloys, Arsenic alloys, Gallium compounds, Aluminum compounds, Arsenides, Phosphides, Direct current, Voltage, Single crystals, Crystal growth, Solid solutions.

A study of injection electroluminescence in p-n junctions was chosen as the most promising approach to the development of a high brightness, high-efficiency low-voltage dc injection electroluminescent light source for display device applications. The compounds GaP, AlAs, AlP, and solid solutions of them and with GaAs, were selected for study, based upon considerations of forbidden energy bandgap and a carrier mobility. Important results are the preparation of polycrystalline AlAs of relatively high purity and the use of this material to prepare single crystal epitaxial layers whose major constituent is AlAs. Epitaxial growth of AlAs layers requires temperatures above 1100C. These temperatures were obtained without introducing interference from competing reactions with the container by adapting a close-spacing procedure in which the source material and the substrate are separated by approximately 0.020 inch. This procedure also provides higher crystal growth rates than those obtained with conventional sealed-tube methods. (Author)

AD-611 168 Div. 25, 14
CFSTI Prices: HC$1.00 MF$0.50

General Electric Research Lab., Schenectady, N. Y.
RESEARCH ON CdTe.
Quarterly progress rept. no. 14,
by R. E. Halsted, D. T. F. Marple, and B. Segall.
31 Jan 65, 13p
Contract AF33 616 8264
Unclassified report

This report includes, Appendix A: CdTe Absorption Edge, Experimental and Appendix B: CdTe Absorption Edge, Theoretical. See also AD-610 012.

Descriptors: (*Cadmium compounds, Tellurides), (*Semiconductors, Band spectrum), Absorption spectrum, Excitation, Theory, Phonons, Single crystals, Quantum mechanics, Electron transitions, Infrared radiation, Wave transmission.

A final addition is given to the experimental study of the band edge of CdTe. This consists of an attempt to obtain the best possible fit of the CdTe data with the theory of indirect interband and indirect exciton absorption. The failure of this theory to account for the data is examined in detail. A summary is also given of a theoretical study of the band edge in CdTe that is nearing completion. It was found that a quantitative fit of the experimental data can be provided by a mechanism involving the creation of a 'direct' exciton simultaneous with the absorption of one or two longitudinal-optical phonons. The theory is carried beyond a previous approximate treatment applied by Thomas, Hopfield, and co-workers (Phys. Rev. 119:570, (1960); J. Appl. Phys. Suppl. 32:2282, (1961)) to absorption edge studies in CdS and ZnO, with a resultant improvement in fitting the data.

AD-611 174 Div. 25
CFSTI Prices: HC$2.00 MF$0.50

General Technology Corp., Elgin, Ill.
THEORETICAL STUDIES OF METHODS OF GENERATING RANDOM WAVES FROM HARMONIC SOURCES.
Rept. for May 63-Jun 64,
by J. C. Samuels. Dec 64, 37p
Technical rept. no. TR-4-2
Contract AF33 657 10945, Proj. 4437, Task 443705
FDL TDR-64-133
Unclassified report

Descriptors: (*Sound generators, Theory), (*Stochastic processes, Sound), Noise, Acoustics, Fourier analysis, Series, Harmonic analysis, Integral equations, Statistical functions, Amplitude modulation, Frequency modulation.

This report is concerned with the approximation of acoustical noise fields by the use of modulated pure

tone sources. Given a specific random signal the methods of orthogonal expansion and Fourier expansion are studied. The integral equation arising from the orthogonal expansion is solved for the normal functions when: a) the power spectrum is given as the ratio of two polynomials, b) Markoff Autocorrelation function, c) stationary band limited Gaussian white noise of mean zero, d) band limited stationary normal white noise on a finite interval, e) white noise. Deterministic and random frequency and amplitude modulation and random switching are examined as ways to broaden spectral components. (Author)

AD-611 177 Div. 25, 8
CFSTI Prices: HC$3.00 MF$0.75

Perkin-Elmer Corp., Norwalk, Conn. Electro-Optical Div.
RESEARCH AND DEVELOPMENT OF NEW LASER MATERIALS.
Final rept. for 1 May-30 Sep 64,
by Robert C. Linares. 30 Oct 64, 56p
Rept. no. M-7881
Contracts AF19 628 4057, AF19 628 2965,
Proj. 4645, Task 464502
AFCRL 64-971

Unclassified report

Descriptors: (*Lasers, Crystal growth), (*Crystal growth, Lasers), Crystals, Sapphires, Spinels, Oxides, Magnesium compounds, Gallium compounds, Aluminum compounds, Beryllium compounds, Silicates, Garnet, Ruby, Impurities, Manganese, Chromium, Vanadium, Absorption.

Crystals of Al2O3:Mn(4+), Al2O3:Cr(3+), Al2O3:V(2+), MgO:Cr(3+), Ga2O3:Cr(3+), Al4SiO8:Cr(3+), MgAl2O4:Cr(3+), MgAl2O4:V(2+), BeAl2O4:Cr(3+) and Gd3Ga5O12:Cr(3+) were grown for laser and spectral evaluation. The physical and optical measurements were made on the crystals which were grown utilizing the flame fusion, Czochralski, flux and vapor techniques. Recommendations are made regarding the potential for future study of each material. (Author)

AD-611 181 Div. 25, 4
CFSTI Prices: HC$3.00 MF$0.75

Crystal Physics Lab. Massachusetts Inst. of Tech., Cambridge.
INVESTIGATION OF THE PHYSICAL NATURE OF PHOTOELECTRIC TRAPPING AND RECOMBINATION CENTERS IN SINGLE CRYSTAL MATERIALS.
Final rept. for 15 Jun 61-14 Jun 64,
by Alexander Smakula. 22 Dec 64, 91p
Technical rept. no. TR-5
Contract AF19 604 8483, Proj. 5621, Task 562104
AFCRL 64-1024

Unclassified report

Descriptors: (*Single crystals, Color centers), (*Color centers, Single crystals), Electrons, Absorption spectrum, Mixtures, Rubidium compounds, Potassium compounds, Chlorides, Bromides, Solid solutions, Electron transitions, Atomic energy levels, Optical analysis, Alkali metal compounds, Halides, Photoelectric materials, Absorption.

In continuation of our study of trapped charge carrier centers in KCl, RbCl, KBr, RbBr and in their solid solutions, the systems RbCl-RbBr and KBr-RbBr were investigated. Crystals of various compositions were irradiated with electrons, 3 Mev, 10,000 to 1,000,000 rads at temperatures 20C, -80C and -190C. The influence of radiation dose, irradiation temperature and crystal composition on spectral position, half width and intensity of the electron and hole trapped centers were studied. A variety of bands (M, F, K, V sub K, V sub 1 and V sub 2 and some others) were observed. In no case is the Mollwo relation valid. In solid solutions the shift of most bands does not go linearly with the composition but deviates toward lower energy. The half width of bands in solid solutions is always greater than in pure components. The concentration of trapped centers increases with irradiation, but at a decreasing rate. Most of the observed bands have been correlated to already-known models, but the correlation of some new ones (L sub x, V sub x) is still uncertain. (Author)

AD-611 182 Div. 25, 8
CFSTI Prices: HC$2.00 MF$0.50

Knights (James) Co., Sandwich, Ill.
HIGH PRECISION 5 MC QUARTZ RESONATORS FOR TEMPERATURE CONTROL BETWEEN 20 AND 30C.
Rept. no. 4, 21 Feb-10 Jun 64,
10 Jun 64, 48p
Contract NObsr89290, Proj. SS294001, Task 9215

Unclassified report

See also AD-601 524.

Descriptors: (*Quartz resonators, Temperature control), (*Temperature control, Quartz resonators), Design, Production, Manufacturing methods, Precision finishing, Crystals, Oscillation, Frequency, Temperature, Graphics, Aging (Materials), Specifications, Life expectancy.

The design and production of 5 mc, 5th overtone, quartz resonator units to operate on the extremely flat portion of the characteristic AT frequency-temperature curve, between 20 and 30C is discussed. Data on actual units is compared with calculations. Aging data is given. (Author)

AD-611 194 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Ecole Normale Superieure, Paris (France).
SPECTROSCOPY OF POINT DEFECTS,
by M. Balkanski, E. da Silva, and W. Nazarewicz.
15 Sep 63, 25p Technical note. no. TN-3
Contract AF61 052 572
AFOSR 5431

Unclassified report

Text is in French.
See also AD-611 145.

Descriptors: (*Absorption spectrum, Silicon), (*Infrared spectroscopy, Silicon), (*Silicon, Radiation damage), (*Crystal lattice defects, Silicon), Impurities, Oxygen, Carbon, Nitrogen, Crystal lattices, Photons, Phonons, Polarization, Fast neutrons, Band spectrum, Energy, Vibration.

The absorption spectra of such impurities as oxygen, carbon, and nitrogen are being studied in the lattice of silicon and molecular vibrations are obtained at 9 microns, 12.2 microns, and 10.6 microns, respectively. High density defects, created by irradiation with fast neutrons, polarize the lattice and make it possible to observe the direct photon-phonon interaction. The infrared absorption spectra due to single phonons are composed of bands at 488, 417, and 331, as well as at 140/cm, corresponding to modes TO, LO, LA, and TA, respectively. The energies of TO, for example, are determined under high resolution at the point of maximum density of modes at Gamma, L., W, and X. They are 516.5 ± 1, 488.5 ± 1, 474 ± 1, and 447 ± 1. (Author)

AD-611 195 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Ecole Normale Superieure, Paris (France).
LOCALIZED VIBRATIONS DUE TO BORON AND LITHIUM IN THE SILICON LATTICE,
by M. Balkanski and W. Nazarewicz. 15 Sep 63, 15p Technical note no. TN-4
Contract AF61 052 572
AFOSR 5432

Unclassified report

See also AD-611 145.

Descriptors: (*Silicon, Crystals), (*Crystal lattices, Silicon), (*Absorption spectrum, Silicon), Infrared spectroscopy, Vibration, France, Impurities, Boron, Lithium, Optical properties, Crystal lattice defects, Polarization.

The infrared absorption spectrum of Silicon crystals containing two electrically compensated impurities, Boron and Lithium, in concentrations above 10 to the 19th power per cu cm reveals six absorption peaks at: 648, 657, 585, 564, 534 and 522/cm 1 attributed to localized vibrations due to those impurities. (Author)

AD-611 199 Div. 25, 17
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Research Labs., Pittsburgh, Pa.
DISCUSSION OF THE J. R. LOW, JR. PAPER ON THE DEFORMATION AND FRACTURE OF IRON,
by R. W. Armstrong. 1961, 8p
Scientific paper no. 62-925-116-P2
Contract AF49 638 1029
AFOSR 2353

Unclassified report

Submitted as a discussion to the AIME 'Symposium on High-Purity Iron' Detroit, 1961.

Descriptors: (*Deformation, Iron), (*Fracture (Mechanics), Iron), (*Iron, Crystal lattices), Crystal lattice defects, Grain structures (Metallurgy), Stresses.

The purpose of this discussion is to direct further attention to the severe matrix (and twin) plastic accommodation experimentally observed in the vicinity of mechanical twins in b.c.c. metals, e.g. alpha iron. This plastic accommodation is intimately associated with the twinning shear displacement, the twin size, and the twin shape. The reason for this distortion being prominent in the b.c.c. metals will be illustrated. An appreciation for the nature of this accommodating flow might allow a better understanding of the relationships between slip, twinning, and fracture in alpha iron. (Author)

AD-611 242 Div. 25, 20
CFSTI Prices: HC$3.00 MF$0.75

Coast and Geodetic Survey, Washington, D. C.
SURFACE MOTIONS FROM UNDERGROUND EXPLOSIONS. APPENDIX A. RESPONSE SPECTRUM ANALYSIS OF RECORDS FROM EVENTS BLANCA AND LOGAN.
Final rept.,
by D. S. Carder, L. M. Murphy, T. H. Pearce, W. V. Mickey, and William K. Cloud. Mar 61, 83p
Contract AT29 2 746, Proj. 26 4
WT 1741

Unclassified report

Rept. on Operation HARDTACK, Phase II, Apr-Oct 58.

Descriptors: (*Nuclear explosions, Shock waves), (*Underground explosions, Shock waves), (*Shock waves, Underground explosions), Measurement, Seismographs, Analysis.

Ground effects resulting from certain HARDTACK II underground explosions were measured by strong-motion and teleseismic seismographs from 2000 feet to distances of nearly 100 miles. In addition, many temporary seismographs were operated by a number of organizations to distances of nearly 2400 miles, and routine seismographs continued to operate on a world wide basis. Some of the results are given in this report. An energetic wave believed reflected from the surface near the source was recorded by some of the strong-motion seismographs. It is out of phase with the initial wave and follows it by about a quarter second. From the ground effects standpoint, the Blanca shot was equivalent to a magnitude 4.8 earthquake, and seismic energy contained in a wave 0.8 km. from the source is believed to contain about 0.4 percent of the yield energy. The Logan and Rainier shots were respectively equivalent to magnitude 4.5 and 4.1 earthquakes and corresponding seismic energies contained respectively 0.5 and 0.3 percent of the yield energy.

AD-611 271 Div. 25, 15
CFSTI Prices: HC$3.00 MF$0.75

General Technology Corp., Elgin, Ill.
APPROXIMATE METHODS OF SIMULATING RANDOM NOISE WITH PURE TONE SOURCES.
Rept. for May 63-Jun 64,
by C. C. Thiel. Dec 64, 71p Technical rept. no. TR-4-3
Contract AF33 657 10945, Proj. 4437, Task 443705
FDL TDR-64-131

Unclassified report

See also AD-611 174.

Descriptors: (*Sound signals, Harmonic analysis), (*Harmonic analysis, Sound signals), (*Sound, Simulation), Noise, Noise analyzers, Sound pitch, Sound generators, Power, Fourier analysis, Statistical functions, Least squares method, Polynomials, Game theory, Stochastic processes.

The problem of the approximation of a given random signal with modulated pure tone signals is studied from the standpoint of approximation of the power spectrum. The equal energy and moment matching techniques are developed for the selections of the modulation parameters of the pure tone sources. Techniques are developed for the selection of parameters of a switched pure tone source. The power spectrum is also approximated by a rational polynomial scheme, which uses a minimax procedure, developed in the appendices, for selection of pure tone operating parameters. Several examples of each of these techniques are given. (Author)

AD-611 286 Div. 25, 4
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
OPTICAL AND MICROWAVE SPECTROSCOPY OF SOLIDS.
Status rept. for 1 Jun-30 Sep 64,
30 Sep 64, 5p
Contract Nonr455100, Proj. NR017 316

Unclassified report

Descriptors: (*Infrared spectroscopy, Solids), (*Microwave spectroscopy, Solids), (*Magneto-optic effect, Semiconductors), Lithium compounds, Hydrides, Infrared radiation, Reflection, Copper compounds,

Chlorides, Wave transmission, Interferometers, Lead compounds, Tellurides, Selenides, Cyclotron resonance phenomena, Tellurium, Acoustic properties.

Research progress in the following areas is summarized: room temperature infrared reflection spectrum of LiH from 2000 to 400/cm; normal and oblique incidence IR transmission of thin CuCl films; theory and measurement of Azbel-Kaner cyclotron resonance in p-type PbTe and PbSe crystals; observation of the plane of polarization of transverse acoustic waves in tellurium.

AD-611 287 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Oklahoma State Univ., Stillwater.
THEORY OF He(+) - He COLLISIONS AT KILOVOLT ENERGIES,
by B. Roth. 1961, 23p
Grant AF AFOSR62 102
AFOSR 2106

Unclassified report

Descriptors: (*Helium, Scattering), Ions, Electron capture, Atomic energy levels, Field theory, Functions, Atomic structure.

The cross section for the scattering of He(+) ions by He atoms in the kilovolt energy range is calculated using only Coulomb interactions. Effects due to electron exchange, antisymmetry in the three electrons and a center of mass correction are found to be important and are taken into account. The differential cross section summed over all states of excitation is sensitive to the wave function used for the He ground state. Calculations are made for two different wave functions, and the results are compared with experiment. (Author)

AD-611 291 Div. 25

Western Ontario Univ., London (Ontario).
EXCITATION OF THE FIRST NEGATIVE SYSTEM OF O2(+) BY A PROTON BEAM IN AIR AND OXYGEN,
by L. Herman, H. I. S. Ferguson, and R. W. Nicholls.
20 Jan 61, 4p
Contract AF49 638 640
AFOSR 209

Unclassified report

Pub. in Canadian Journal of Physics v39 p476 1961 (Copies available only to DDC users).

Descriptors: (*Proton bombardment, Oxygen), (*Electron transitions, Oxygen), (*Oxygen, Excitation), Proton beams, Molecular spectroscopy, Atomic energy levels, Low-pressure research, Band spectrum, Nitrogen, Air, Ions.

Preliminary results of a further laboratory study are reported and concern the excitation of the bands of the O2(+) first negative system by 40 kev proton beams in air and oxygen at low pressures. The resulting emission spectra have been investigated over the pressure range .1 to .001 mm. Hg., and over the wavelength range 2300 to 7000 Angstroms.

AD-611 301 Div. 25

Illinois Univ., Urbana.
FINE STRUCTURE IN THE ABSORPTION EDGE OF THE SILVER HALIDES,
by F. C. Brown, T. Masumi, and H. H. Tippins.
1961, 8p Technical note TN-6
Contract AF49 638 579
AFOSR 1392; PB 158 430

Unclassified report

Pub. in Physics and Chemistry of Solids (U. S.) v22 p101-7 1961 (Copies available only to DDC users). (A manuscript version is available from CFSTI as PB-158 430 $2.60).

Descriptors: (*Halides, Absorption spectrum), (*Photoconductivity, Halides), (*Silver compounds, Halides), Bromides, Chlorides, Optical properties, Photons, Line spectrum, Hyperfine structure.

The results of new optical absorption measurements on pure AgCl and AgBr will be reported and compared with the wavelength dependence of photoconductivity in these materials. Detailed structure consisting of low-level absorption tails and several shoulders has been found at various temperatures down to 4.2 K. The data will be analysed in terms of indirect optical transitions together with a plausible band structure and vibration spectrum. (Author)

AD-611 311 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Purdue Research Foundation, Lafayette, Ind.
PROJECT DEFENDER,
Status rept. for 1 Oct 63-30 Sep 64,
by A. K. Kamal. 30 Sep 64, 4p
Contract Nonr110024, Proj. NR015 803

Unclassified report

Descriptors: (*Lasers, Crystallography), (*Crystallography, Lasers), Symmetry (Crystallography), Power, Polarization, Quartz, Potential theory.

It has been established that when a high energy laser pulse traverses a crystalline medium that lacks inversion symmetry, a d.c. polarization is developed in the medium. By measuring the d.c. polarization, an estimate of the nonlinear polarization coefficient was expected to be obtained. One of the two second order nonlinear coefficients was measured using a medium powered (4 to 8 joules) laser. This laser was acquired with the supplementary funds provided by the school. A high power laser delivering more than 100 joules has been built in the laboratory that would facilitate doing better experimental work in the laboratory. Some of the early results are being checked with the high power laser that was recently built. The advantage of using this laser is that the requirements on the gain bandwidth of the detecting system is considerably less and better accuracies can be achieved. A preliminary investigation has been initiated on the feasibility of generating subharmonics by passing the laser beam through nonlinear medium.

AD-611 336 Div. 25, 8
CFSTI Prices: HC$3.00 MF$0.75

Thomas (A. S.), Inc., Westwood, Mass.
THEORY OF GRADED RADAR ABSORBER MATERIALS.
Interim engineering rept.,
by C. M. Copenhaver and W. H. McNeill. 15 Jan 65,
69p Rept. no. M-63-1
Contract AF33 657 11475

Unclassified report

Descriptors: (*Dielectrics, Antenna configurations), (*Antenna configurations, Dielectrics), Permeability (Magnetic), Anisotropy, Cylindrical bodies, Electromagnetic fields, Green's function, Integrals, Vector analysis, Tensor analysis, Propagation, Electromagnetic waves.

Expressions for the effective dielectric constant and magnetic permeability of an artificial dielectric consisting of a rectangular array of infinitely-long circular rods are

derived in terms of the spatial and electrical characteristics of the rods and the surrounding medium. The mean electromagnetic field in the dielectric, from which the effective dielectric constant and permeability can be deduced, is determined for the near field case. Thus, the results apply for closely-packed thin rods. The effective dielectric constant and magnetic permeability are given in terms of the rod diameter, rod spacing, dielectric constants and magnetic permeabilities of the rods and surrounding medium, and the wave length of the incident wave. (Author)

AD-611 341 Div. 25

Air Force Cambridge Research Labs., Bedford, Mass.
ABSORPTION COEFFICIENTS OF CARBON MONOXIDE IN THE 1006-600-A WAVELENGTH REGION.
Physical sciences research papers,
by R. E. Huffman, J. C. Larrabee, and Y. Tanaka.
11 Nov 63, 15p AFCRL-64-586, PSRP-35
Proj. 8627

Unclassified report

Pub. in Journal of Chemical Physics (U. S.) v40 n8 p2261-69 Apr 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Carbon compounds, Monoxides), (*Absorption spectrum, Carbon compounds), Spectra (Visible and Ultraviolet), Band spectrum, Atomic energy levels, Electron transitions.

Absorption coefficients, or cross sections, of carbon monoxide have been measured in the 1006-600-A wavelength region at a bandwidth of 0.5 A using the Hopfield helium continuum as background and a photoelectric technique. Strong bands (up to k approximately 4500/cm) were observed from 1006 A to about 715 A and weaker bands were found at shorter wavelengths. These bands agree well in location and relative intensity with absorption spectra previously available. Continuous absorption begins at about 960 A and continues to 600 A. At wavelengths less than the first ionization potential at 884.7 A, intense ionization continua are observed. There is one maximum in the continuum of k=710/cm at about 870 A associated with the CO(+)X2Sizma(+) state and another maximum of k=950/cm at about 724 A associated with the CO(+)A2Pisubi state. (Author)

AD-611 355 Div. 25, 6, 8

Electrical Engineering Research Lab., Univ. of Illinois, Urbana.
PHOTOMULTIPLIER DETECTION OF MICROWAVE MODULATED LIGHT,
by O. L. Gaddy and D. F. Holshouser. 28 Feb 62, 2p
Contract AF49 638 556
AFOSR 2306

Unclassified report

Pub. in Institute of Radio Engineers. Proceedings (U. S.) v50 n6 Jun 1962 (Copies not available to DDC or Clearinghouse customers).
See also AD-611 356.

Descriptors: (*Photomultipliers, Detection), (*Detection, Light), (*Light, Modulation), (*Microwave frequency, Modulation), Kerr cells.

AD-611 356 Div. 25, 8, 24

Electrical Engineering Research Lab., Univ. of Illinois, Urbana.
MICROWAVE MODULATION OF LIGHT USING THE KERR EFFECT,
by D. F. Holshouser, H. Von Foerster, and G. L. Clark. 10 May 61, 7p
Contract AF49 638 556
AFOSR 701

Unclassified report

Pub. in the Optical Society of America. Journal (U. S.) v51 n12 p1360-5 Dec 1961 (Copies not available to DDC or Clearinghouse customers).
See also AD-611 355.

Descriptors: (*Light, Modulation), (*Microwave frequency, Modulation), (*Kerr cells, Modulation), Electrostatic fields, Cavity resonators, Camera shutters, Electric fields, Carbon compounds, Sulfides.

Modulation of light at 3 and 6 kMc is achieved by applying a superimposed electrostatic and microwave field to a carbon-disulfide Kerr cell which is incorporated within the high-electric-field region of a resonant cavity. The development of this light shutter requires the analysis of the Kerr effect under circumstances in which the transit time of light is appreciable. A Kerr cell whose length is such that the transit time of light is one-half the period of the modulating microwave field proves to have particular advantages over other designs. The light shutter is realized with a re-entrant microwave cavity with provision for the application of electrostatic as well as microwave fields. At about 26-kv dc and 10-kw pulsed 3-kMc ac power, the system modulates a light beam of several milliwatts radiant power up to 80%. (Author)

AD-611 364 Div. 25, 4
CFSTI Prices: HC$1.00 MF$0.50

Iowa State Univ. of Science and Tech., Ames.
HEAT CAPACITY LAG IN HEAVY GASES.
Final rept.,
by Sam Legvold and John R. Olson. Jul 61, 3p
Contract AF49 638 731; Grant AF AFOSR61 87
Proj. 9751
AFOSR 1077

Unclassified report

Prepared in cooperation with Iowa Engineering Experiment Station, Ames.

Descriptors: (*Gases, Relaxation time), Electric fields, Hydrogenated hydrocarbons, Alkenes, Velocity, Nuclear moments, Transport properties, Sound, Diffusion, Vapors, Vibration, Polarization.

Purpose: To examine and interpret the dispersion of sound in heavy vapors. Summary: The general objective under this and several preceding contracts has been the study and interpretation of sound dispersion in heavy gases. In particular, the objective under the present contract is to determine the effect of electric field on the vibrational relaxation times of some heavy polar gases. One might expect that an electric field would partially align polar molecules so that their orientation upon collision would not be completely random as before. Hence, a small change in the relaxation time might be expected. The polar gases, CH2F2, CHF3 and C2H4 which have a high, medium and zero dipole moment respectively were used in the study. They also have dispersion regions which are easily accessible. Argon, which has no dipole moment and no dispersion, was examined to insure that the electric field produced no other effect on the velocity than that due to molecular alignment. The gases were examined in various field strengths with the maximum field being 9000 volts per centimeter. No measurable effect on the velocity was found for any of the gases examined. Hence, one can con-

clude that an electric field of this strength has no appreciable effect on the relaxation times of heavy polar gases. (Document quoted in its entirety).

AD-611 381 Div. 25

Delaware Univ., Newark.
MADELUNG CONSTANTS FOR THE CALCIUM CARBIDE AND PYRITE CRYSTAL STRUCTURES,
by Robert Wood. 12 Feb 62, 4p
Contract AF49 638 1054
AFOSR 2105
Unclassified report

Pub. in Journal of Chemical Physics (U. S.) v37 n3 p598-600 1 Aug 1962 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Electrostatics, Crystals), (*Crystals, Electrostatics), (*Pyrites, Crystals), (*Calcium compounds, Carbides), Crystallography.

The Madelung constants for the calcium carbide and pyrite crystal structures were calculated assuming that the anion can be represented by two spherically symmetric charge distributions. The results indicate that the assumption that the anion is spherically symmetric can lead to small errors in the case of the pyrite structure and large errors in the case of the calcium carbide structure. (Author)

AD-611 384 Div. 25

Pennsylvania Univ., Philadelphia.
ON THE ROLE OF CONDENSED VACANCIES AND INTERSTITIALS IN FATIGUE,
by R. K. McCrone and Doris Kuhlmann-Wilsdorf.
14 Feb 59, 2p
Contract AF49 638 435
AFOSR 2322
Unclassified report

Pub. in die Naturwissenschaften (West Germany) v46 n9 p334-35 1959 (Copies available only to DDC users) Prepared in cooperation with Clarendon Lab., Univ. of Oxford (England).

Descriptors: (*Crystal lattice defects, Fatigue (Mechanics)), (*Fatigue (Mechanics), Crystal lattice defects), Nucleation, Impurities, Theory.

AD-611 392 Div. 25, 14
CFSTI Prices: HC$4.00 MF$1.00

Oklahoma State Univ., Stillwater. Research Foundation.
PHOTOELECTRONIC ANALYSIS OF IMPERFECTIONS IN GROWN STANNIC OXIDE CRYSTALS,
by Jack E. Houston. Feb 65, 149p
Technical rept. no. TR-4
Contract Nonr259501, Proj. NR015 222
Unclassified report

See also AD-601 798.

Descriptors: (*Crystals, Tin compounds), (*Crystal lattice defects, Atomic energy levels), Oxides, Single crystals, Heat of activation, Photoconductivity, Thermoelectricity, Temperature, Electric currents, Spectrophotometers, Semiconductors.

A study of the imperfection properties of grown stannic oxide single crystals was made using photoelectronic techniques. The primary purpose was to propose an energy level scheme for defects in these samples based on the results of spectral response, thermally stimulated current, thermal quenching, dark conductivity as a function of temperature, and photo-thermoelectric voltage measurements. Thermally stimulated current results indicate the existence of three trapping levels with average activation energies of 0.21, 0.52 and 0.60 ev. Extrinsic thermal quenching results have established that these levels are all trapping states for electrons, implying that the two shallow ones are completely compensated while the deeper one is only partially compensated. Intrinsic thermal quenching measurements indicate the existence of a compensated acceptor level lying 0.33 ev above the valence band and acting under certain conditions as a sensitizing center. Also found are more-or-less discrete levels having optical activation energies of approximately 1.0, 1.3 and 1.8 ev.

AD-611 403 Div. 25, 8, 14
CFSTI Prices: HC$2.00 MF$0.50

Radio Corp. of America, Lancaster, Pa.
RESEARCH STUDIES ON THERMIONIC CONVERTERS, EMITTER SHELL PHASE.
Quarterly technical rept. no. 4, 1 Apr-15 Dec 64,
by G. Y. Eastman. Dec 64, 43p
Contract DA36 039AMC03197E, Task 1G6 22001A055 02
Unclassified report

See also AD-601 111.

Descriptors: (*Thermionic converters, Heaters), (*Heaters, Thermionic converters), Aluminum compounds, Oxides, Beryllium compounds, Silicon compounds, Carbides, Molybdenum, Fuels, Combustion products, Energy conversion, Design.

Eighteen converters were fabricated, 16 with the double-walled emitter-shell geometry. After the solution of a number of fabrication problems, a converter was constructed which produced power output equivalent to electrically heated converters. This converter was successfully life tested for 1000 hours at an average emitter temperature of 1235° Centigrade. A second converter was life tested at an emitter temperature of 1320° Centigrade for 202 hours before failing. A converter was subjected to thermal cycling from -40° Centigrade to +1400° Centigrade in less than 5 minutes without failure in accordance with the contract requirements. Permeation testing was carried out on an aluminum oxide sample in a fossil-fuel environment. The principle permeating gas was shown to be oxygen. Tests on pyrolytic silicon carbide were being conducted as the reporting period closed.

AD-611 417 Div. 25, 14
CFSTI Prices: HC$4.00 MF$1.00

Electro-Optical Systems, Inc., Pasadena, Calif.
REPLICA OPTICS.
Final rept. for 14 Feb-12 Sep 64,
by D. E. Stewart, H. Meyer, R. Bauer, R. Furlong, and R. Frank. 26 Feb 65, 142p Rept. no. EOS-4821-Final
Contract DA04 495AMC376A
Unclassified report

Descriptors: (*Plastics, Optical materials), (*Optical glass, Substitutes), (*Mirrors, Plastics), Plastic lenses, Epoxy plastics, Plastic coatings, Prisms (Optics), Spheres, Adhesives, Optical coatings, Feasibility studies, Environmental tests, Shock (Mechanics), Optics.

The scope of the program was directed to the replication of concave spherical mirrors having a diameter of 4 inches. The objectives of this 6-month program were to procure necessary masters, fabricate, and test approximately 24

replica spheres, continue adhesives and coatings investigation, investigate advanced preform and master techniques, and analyze and specify production processes. These objectives were achieved. An analysis of the replication process was updated, production processes specified, 4 masters received or fabricated, 7 submasters made, preforms procured, adhesives and coatings investigated, fixtures improved, 39 replicas plus 3 replicas by submastering made and analyzed, and the environmental and optical tests described. (Author)

AD-611 422 Div. 25, 1
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
SUPPORTING POWER OF SKELETON AND CORRUGATED CIRCULAR CYLINDRICAL SHELLS DURING COMPRESSION,
by S. N. Kan. 15 Feb 65, 15p FTD-TT-64-952
TT 65-61762

Unclassified report

Unedited rough draft trans. of Prykladna Mekhanika (USSR) 1963, v. 9, no. 5, p. 465-472.

Descriptors: (*Structural shells, Loading (Mechanics)), Cylindrical bodies, Sandwich construction, Compressive properties, Deformation, Fourier analysis, Series, Potential theory, USSR.

A method is proposed for calculating the supporting power of frames and corrugated circular cylindrical shells during compression. This method is based on the assumption that the longitudinal elements of the real shell, having initial bucklings, are in state of longitudinal-transverse buckling. Derived are calculation dependences individually for axially symmetrical and non axially symmetrical deformations. Resolving square equations graphically show the effect of individual parameters of the system on the magnitude of the destructive compression stresses. In the order of illustrations are given the examples of calculating the supporting power of corrugated circular cylindrical shells. Measures, leading to an increase in critical stresses of the shell and destructive stresses of individual corrugations or stringers, assist in increasing the supporting power of the system. The described method of calculating the supporting power can be applied to the case of transverse load, which, like buckling is capable of sharply reducing the supporting power of the shell. The relatively simple method of calculating the supporting power of framed and corrugated shells upon compression offers the possibility of making selection of system parameters from minimum weight conditions, and also to establish maximum buckling amplitude values, which may be committed at manufacture. (Author)

AD-611 423 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ARRANGEMENT FOR MEASURING THE HALL EFFECT,
by V. N. Bogomolov. 11 Feb 65, 7p FTD-TT-64-945
TT 65-61763

Unclassified report

Unedited rough draft trans. of mono. Novye Mashiny i Pribory dlya Ispy'taniya Metallov: Sbornik Statei, Moscow, 1963, p. 159-161.

Descriptors: (*Hall effect, Measurement), Potentiometers, Measuring devices (Electrical and electronic), USSR.

Described is an installation for measuring Hall's EMF by the I and H method, in which on account of element simplification it was possible to avoid certain difficulties and interferences, limiting its sensitivity.

AD-611 429 Div. 25, 12, 15
CFSTI Prices: HC$3.00 MF$0.75

Bege (J. R. M.) Co., Arlington, Mass.
THE CATENARY IN SPACE. FREE MOTIONS OF FLEXIBLE LINES.
Final scientific rept.,
by R. M. Langer. Dec 64, 91p Rept. no. 6454
Contract AF49 638 1327
AFOSR 64-2517

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. A copy is available for public sale.

Descriptors: (*Flexible structures, Motion), (*Motion, Flexible structures), (*Filaments, Deformation), Mechanical properties, Gravity, Velocity, Partial differential equations, Integral equations, Vector analysis, Matrix algebra.

The nature and importance of the catenary in space (flexible systems in one dimension) are discussed. Equations of motion are developed in more complete and universal form than in the literature. The catenary is described by means of a system of four, first-order, quasi-linear, hyperbolic, partial differential equations. The special circumstances are treated where the first order system reduces to a standard second order wave equation familiar in the literature. The four characteristics of the hyperbolic system are found and also the vectors which help formulate combination variables suitable for the catenary problem. Some special solutions are presented for interesting catenary motions. A general treatment is formulated in terms of integral equations for the full catenary problem of planar motion with two independent variables and four dependent catenary parameters. Extensions to other novel problems are indicated. (Author)

AD-611 430 Div. 25, 17
CFSTI Prices: HC$2.00 MF$0.50

Perkin-Elmer Corp., Norwalk, Conn.
THE PREPARATION OF ORIENTED SINGLE CRYSTAL SPHERES OF INTERMETALLIC COMPOUNDS BETWEEN THE RARE EARTH AND IRON GROUP METALS.
Rept. for Jul 63-Jul 64,
by James F. Nester. Jan 65, 29p
Contract AF33 657 11282, Proj. 7371, Task 737103
ML TR-64-362

Unclassified report

Descriptors: (*Single crystals, Spheres), (*Intermetallic compounds, Single crystals), Yttrium alloys, Cobalt alloys, Dysprosium alloys, Iron alloys, Melting, Metallography, Crystal growth, Preparation, X-ray diffraction analysis, Magnetic properties.

A process has been developed whereby single crystals of incongruently melting intermetallic compounds between rare earth and iron group transition elements can be grown and fabricated into small spheres. Single crystals of YCo5, NdCo5, DyCo5, and 'YFe9' have been grown, and spheres up to 2.67 millimeters in diameter have been fabricated from these materials (with the exception of

DyCo5). Metallographic techniques were developed for these materials, and in many cases the results differed substantially from published data. Metallographic and x-ray techniques were used to establish the single crystal character of the materials. (Author)

AD-611 431 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Sperry Rand Research Center, Sudbury, Mass.
INVESTIGATION OF THE ELECTRICAL AND OPTICAL PROPERTIES OF JUNCTIONS IN VAPOR-DEPOSITED COMPOUND SEMICONDUCTORS.
Semi-annual scientific rept. no. 1,
by Henry T. Minden. Dec 64, 22p SRRC-RR-64-105
Contract AF19 628 4189, Proj. 5621, Task 562103
AFCRL 65-30

Unclassified report

Descriptors: (*Lasers, Semiconductors), (*Semiconductors, Physical properties), (*Germanium, Semiconductors), Electrical properties, Optical properties, Vapor plating, Gallium alloys, Arsenic alloys, Tunnel diodes, Impurities, Tin, Zinc, Hydrogen, Reduction (Chemistry), Epitaxial growth.

Germanium was epitaxially deposited on gallium arsenide by means of the hydrogen reduction of GeC14. Above 800C, germanium reacted with the GaAs seed to form a black powder. Proper deposition was observed below about 750C. Nonetheless, cross doping of the Ge layer by gallium was observed even at deposition temperatures as low as 670C; the heterojunctions showed tunnel diode characteristics. Deliberately doped junctions of p-Ge on n-GaAs showed the I-V characteristics of Ge junctions, while the photovoltaic response was that of a GaAs junction. Epitaxial lasers were made by the deposition of zinc-doped epitaxial layers on n-type GaAs substrates. It was necessary to codeposit tin along with the zinc. The threshold current density was about 13,000 amps/sq. cm. (Author)

AD-611 439 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Cornell Univ., Ithaca, N. Y.

THERMAL CONDUCTIVITY OF SUPERCONDUCTING LEAD,
by James Wing Fai Woo. Feb 65, 13p
Technical rept. no. TR-1
Contract Nonr40138

Unclassified report

Descriptors: (*Thermal conductivity, Lead), (*Lead, Thermal conductivity), Superconductors, Mathematical analysis.

AD-611 463 Div. 25, 2, 8

Stanford Electronics Labs., Stanford Univ., Calif.
FUNDAMENTALS OF VERY LOW FREQUENCY EMISSION GENERATION MECHANISMS.
Revised ed.,
by N. Brice. 28 Jul 64, 8p
Grant AF AFOSR62 370
AFOSR 65 0262

Unclassified report

Pub. in Journal of Geophysical Research (U. S.) v69 n21 p4515-22 Nov 1, 1964 (Copies not available to DDC or Clearinghouse customers).
Revision of rept. dated 25 Jun 64.

Descriptors: (*Very low frequency, Propagation), (*Whistlers, Charged particles), Resonance, Electromagnetic waves, Ionospheric propagation, Upper atmosphere, Doppler effect, Radio signals, Cerenkov radiation, Electrons, Protons.

The transfer of energy between whistler-mode signals and energetic charged particles is examined. Resonance conditions are derived, leading to a classification of the mechanisms previously suggested for the generation of VLF emissions. The relationship between change in energy and change in pitch angle of the particles is derived for the transverse resonance interaction with longitudinal whistler-mode waves. Features of the transverse resonance plasma instabilities and the anomalous Doppler effect are clarified. (Author)

26. Production and Management

AD-610 832 Div. 26
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
HOW USEFUL ARE 'SCIENTIFIC' TOOLS OF MANAGEMENT,
by Edward F. R. Hearle. 24 Mar 61, 9p P-2260
Unclassified report

Remarks to be presented as part of a panel on this topic at the National Conference of the American Society for Public Administration, Philadelphia, 7 Apr 61.

Descriptors: (*Management engineering, Mathematical models), (*Management planning, Mathematical models), (*Decision making, Management planning), Linear programming, Dynamic programming, Queueing theory, Game theory, Models (Simulations), Monte Carlo method, Symposia.

It is urged that public administrators become familiar with formulating problems in the explicit symbolism of models, striving to make goals and criteria fully explicit even if the explication is a little forced. It is also urged that they become generally familiar with the mathematical properties of these tools so that real world problems suitable for solution by their use can be recognized. Such problems do exist: resource allocations must be made, waiting line delays must be dealt with, competitive strategies must be selected. It is suggested that both the form and the substance of the scientific tools of management can make a substantial contribution to the solution of these and other problems of public administration.

AD-610 852 Div. 26, 12, 17
CFSTI Prices: HC$2.00 MF$0.50

Norair Div., Northrop Corp., Hawthorne, Calif.
DEVELOPMENT OF MANUFACTURING CAPABILITY FOR PRODUCING HIGH PERFORMANCE ALUMINUM AND MAGNESIUM ALLOY CASTINGS.
Quarterly progress rept. no. 3, 1 Nov 64-31 Jan 65,
by A. J. Iler. Feb 65, 27p NOR-65-28
Contract AF33 615 1341, Proj. 8 119
Unclassified report

See also AD-608 290.

Descriptors: (*Aluminum alloys, Castings), (*Magnesium alloys, Castings), (*Castings, Spacecraft), (*Casting alloys, Mechanical properties), Zinc alloys, Silver alloys, Zirconium alloys, Stresses, Corrosion, Heat treatment, Tensile properties, Molding, Casting, Tests.

This report gives an account of the tabulation of mechanical properties achieved in the alloys under study; the stress corrosion testing currently being performed; a general summary of Phase II effort; and some data relevant to the program reported in addition to the state of technology summary.

AD-610 859 Div. 26, 17
CFSTI Prices: HC$2.00 MF$0.50

Illinois Inst. of Tech., Chicago.
THE ANNEALING OF EXPLOSIVELY DEFORMED COPPER. I. THE PRE-SOFTENING STAGES.
Technical rept. no. 13,
by Paul Gordon, D. C. Brillhart, and A. G. Preban.
Jan 65, 44p
Contract Nonr140603
Unclassified report

Descriptors: (*Heat treatment, Copper), (*Explosive forming, Copper), (*Copper, Heat treatment), Compressive properties, Tensile properties, Deformation, Hardness, Resistance (Electrical), X-ray diffraction analysis, Electron microscopy, Stresses, Experimental data.

OFHC copper explosively deformed at pressures between 75 and 435 kilobars is found to be characterized by high residual stresses, compressive near the surface and tensile further in. Annealing after such deformation is indicated to take place in three somewhat overlapping stages. Property changes associated with the first tv o stages, and possible interpretation of the effects, are discussed in detail. The third stage--the major softening stage--is treated briefly as an introduction to a more complete treatment to be given in a subsequent report. (Author)

AD-610 872 Div. 26
CFSTI Prices: HC$2.00 MF$0.50

Mechanical Technology, Inc., Latham, N. Y.
SPECTRAL ANALYSIS OF GAS BEARING SYSTEMS FOR STABILITY STUDIES,
by C. H. T. Pan. 15 Dec 64, 42p MTI-64TR58
Contract Nonr373000, Proj. NR061 131
Unclassified report

Descriptors: (*Journal bearings, Lubrication), (*Gas bearings, Stability), Thrust bearings, Oscillation, Frequency, Mathematical analysis, Effectiveness, Perturbation theory, Damping, Frequency, Spectroscopy.

Stability map for a gas-bearing supported rotor can be constructed from the periodic dynamic perturbation solution of the gas bearing equation about the equilibrium condition. A complete frequency range of the perturbation solution is required. Effective system stiffness and damping can be defined in terms of the perturbation solution of the gas bearing. The condition of neutral stability corresponds to the vanishing of the effective damping, yielding the characteristic frequency, and resonance at the characteristic frequency with the equivalent stiffness, yielding the critical mass. An excess of rotor mass causes instability if the effective damping increases with frequency, at the characteristic frequency, and conversely. For unloaded, journal bearings possessing rotational symmetry, the stability map can be constructed from their steady-whirl solutions. An example illustrating the latter case is given in terms of a herringbone-grooved journal bearing. This method of stability analysis is applicable to both thrust and journal bearings for both whirl and pneumatic-hammer instabilities. (Author)

AD-610 995 Div. 26, 7
CFSTI Prices: HC$2.00 MF$0.50

Rotron Mfg. Co., Woodstock, N. Y.
THE DEVELOPMENT OF A GAS LUBRICATED BEARING BLOWER ASSEMBLY FOR USE IN AN AN/SRT-15 RADIO TRANSMITTER.
Interim development rept. for 3 Aug-2 Nov 64.
11 Dec 64, 38p
Contract NObsr87522
Unclassified report

Descriptors: (*Gas bearings, Design), (*Journal bearings, Gas bearings), (*Thrust bearings, Gas

bearings), (*Radio transmitters, Gas bearings), Electric motors, Blowers, Environmental tests, Magnetic fields, Stabilization systems, Test equipment, Test methods, Measurement, Loading (Mechanics).

Work has commenced on the evaluation of gas bearing geometry effects and motor magnetic load effects on the performance characteristics of hydrodynamic type gas bearings. Air flow cooling requirements were investigated for an AN/SRT-15 Radio Transmitter to establish the operational design parameters for development of a gas lubricated blower capable of cooling the transmitter. A study was conducted concerning economical approaches for the design and application of hydrodynamic gas bearings in blowers and fans.

AD-611 005 Div. 26, 15, 30
CFSTI Prices: HC$6.00 MF$1.50

California Univ., Los Angeles.
A SIMULATION STUDY AND ANALYSIS OF A TWO STATION, WAITING-LINE NETWORK MODEL.
Doctoral thesis; Management Sciences Research Project, by Rosser T. Nelson. 5 Jan 65, 266p RR-91, WP-59
Contract Nonr23373, Proj. NR047 003
Unclassified report

Prepared in cooperation with Western Management Science Institute.

Descriptors: (*Industrial production, Mathematical models), (*Queueing theory, Industrial production), (*Mathematical models, Industrial production), Scheduling, Management engineering, Industrial research, Decision theory, Stochastic processes, Statistical analysis, Production control, Probability, Simulation, Correlation techniques, Programming languages, Operations research.

The research is intended to supplement analytical studies of waiting-line network models and simulation studies designed to compare the functioning of such modeled systems under alternative queue disciplines. The model employed consists of two single-channel service stations. The routing of each arriving customer through the two service stations is generated by a stationary Markov chain. The queue discipline is first-come, first-served. The use of the word network to describe such a model is based upon the fact that (at least some) arriving customers require one or more services at more than one service station. This implies that the arrival process at each service station consists of arrivals from outside the system and of departures from other service stations in the network. The two service station model was selected for this initial venture because it possesses the basic network structure without the added involvement caused by system size alone.

AD-611 021 Div. 26, 17
CFSTI Prices: HC$2.00 MF$0.50

Defense Metals Information Center, Columbus, Ohio.
PREMIUM-QUALITY ALUMINUM CASTINGS,
by K. R. Grube, D. N. Williams, and H. R. Ogden.
4 Jan 65, 48p Rept. no. DMIC-211
Contract AF33 615 1121, Proj. 8975
Unclassified report

Descriptors: (*Aluminum alloys, Castings), (*Castings, Aluminum alloys), Casting, Heat treatment, Melting, Mechanical properties, Quality control, Non-destructive testing, Specifications.

Premium-quality castings are those which are guaranteed to show a specified high level of mechanical properties. The properties currently being achieved represent significant improvements over those which can be achieved in conventional aluminum-alloy castings and approach the properties currently obtainable in wrought aluminum alloys. These property advances are largely the result of improved casting technique and design. These castings are gradually finding acceptance and usage in aerospace applications, thanks to integrated efforts between the casting producers and their customers. (Author)

AD-611 025 Div. 26, 17
CFSTI Prices: HC$2.00 MF$0.50

ManLabs, Inc., Cambridge, Mass.
THERMOMECHANICAL TREATMENTS APPLIED TO ULTRA-HIGH STRENGTH STEELS.
Progress rept. no. 3,
by D. Kalish and S. A. Kulin. Dec 64, 30p
Contract NOw64 0356c
Unclassified report

See also AD-607 729.

Descriptors: (*Hot working, Steel), (*Steel, Hot working), Nickel alloys, Cobalt alloys, Toughness, Carbon alloys, Microstructure, Heat treatment, Austenite, Deformation, Martensite, Fracture (Mechanics), Mechanical properties, Bainite.

Efforts were made in the following areas: determining the influence of austenite deformation processes on the properties of the 0.45% C alloy (steel H) in the martensitic condition, establishing the effect of variations in pre-tempering temperature, and retempering temperature on the mechanical properties of steel H, applying thermo-mechanical treatments to a 0.25% carbon alloy and following the microstructural changes accompanying strain-tempering of steel H.

AD-611 026 Div. 26
CFSTI Prices: HC$5.00 MF$1.25

California Univ., Los Angeles.
AN EXPERIMENTAL INVESTIGATION AND COMPARATIVE EVALUATION OF PRIORITY DISCIPLINES IN JOB SHOP-LIKE QUEUEING NETWORKS.
Doctoral thesis; Management Science Research Project, by Yves R. Nanot. 13 Dec 63, 190p RR-87, WP-45
Contract Nonr23373, Proj. NR047 003
Unclassified report

Prepared in cooperation with Western Management Science Institute.

Descriptors: (*Queueing theory, Management engineering), (*Scheduling, Production control), Systems engineering, Optimization, Industrial production, Statistical analysis, Stochastic processes, Mathematical models, Programming (Computers), Simulation, Series, Probability.

A job shop model including several one-machine centers is considered. Jobs from outside the system arrive for service in a Poisson time series. Upon entering the system, each job is assigned a unique routing. The sequence of service centers on a job's routing is generated by means of a transition probability matrix, fixed in time, which associates with each center the probabilities of going to any other center or out of the system. Processing times at each center are statistically independent and exponentially distributed. In general, queues form at the centers. A computer simulator was written in SIMSCRIPT. Attention was focused on flow time distributions of jobs, with alternative priority schemes. A total of ten different 'static' priority rules was investigated.

AD-611 046 Div. 26
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ASTOUNDING AUTOMATS,
by P. Adamov. 19 Jan 65, 5p FTD-TT-64-790
TT 65-61714
Unclassified report

Unedited rough draft trans. from Pravada, Moscow (USSR) 1964, no. 89, 29 Mar, p. 3.
See also AD-607 312.

Descriptors: (*Pneumatic systems, Automation), (*Pneumatic devices, Standardization), USSR.

A system of standard pneumatic devices and parts is discussed which includes 24 standard items executing the simplest operations: pneumo relay, comparison elements, memories, summation, pneumoresistors, pneumatic capacitances, amplifiers, and repeaters. The system was constructed with the same principles that are used in radioelectronics. Its elements perform the same functions as radio components. Structurally, the elements of pneumoautomation also resemble radioelectronic items. They are mounted on a plate, with the aid of brass shanks. This allows them to be easily and rapidly mounted and replaced. Connection between elements is realized through openings in the 'shanks' and ducts in the transparent organic glass plates.

AD-611 162 Div. 26
CFSTI Prices: HC$5.00 MF$1.00

Wah Chang Corp., Albany, Oreg.
FABRICATION OF WIDE TUNGSTEN SHEET BY POINT DEFORMATION TECHNIQUES.
Final technical rept. for 1 Jul 61-31 Dec 64,
by Samuel A. Worcester. 31 Dec 64, 165p
Contract NOw61 1046c Unclassified report

See also AD-275 742.

Descriptors: (*Tungsten, Sheets), (*Mechanical working, Tungsten), Deformation, Metal plates, Temperature, Manufacturing methods, Conical bodies, Thickness.

An experimental program was conducted to establish the feasibility of producing high quality wide tungsten sheet through use of the flow turning process. To establish basic limitations for the flow turning of various tungsten starting materials, a series of 90-degree included angle cones were flow turned from 0.125 in. thick tungsten plate. It was established that as-sintered, sintered and forged, sintered and rolled, and arc cast and rolled plates could be flow turned at minimum temperatures of 1400F, 1100F, 900F, and 600F, respectively.

AD-611 188 Div. 26, 17

Lockheed Missiles and Space Co., Sunnyvale, Calif.
PROPERTIES OF X7006, AND X7039 ALUMINUM ALLOY WELDMENTS.
Final technical rept.,
by A. T. D'Annessa. Feb 64, 43p Rept. no. 4-11-74-1
Unclassified report

Available only for reference use at DDC field services. Copy is not available for public sale.

Descriptors: (*Aluminum alloys, Welds), (*Welds, Aluminum alloys), (*Mechanical properties, Welds), Sheets, Metal plates, Aging (Materials), Microstructure, Tensile properties, Welding, Heat treatment, Cold working.

This report presents the results of studies conducted to determine the fusion welding characteristics and the mechanical properties of the X7002, X7006, and X7039 aluminum alloy sheet and plate weldments. Welding was performed with the semi-automatic gas-tungsten arc process using single-pass, DCSP, square-butt techniques. The MRD 705, X5080, and X5039 filler compositions were used to weld the X7002, X7006, and X7039 alloys, respectively. Static tensile properties of base-metal control specimens and weld specimens representing various weld/heat-treat sequences, thicknesses, and test temperatures are given. In addition, the effects of natural-aging on room temperature properties are presented for as-welded plus 2, 6,12, and 16 weeks natural-aging reference points. The effects of prior critical cold-work on grain growth and room temperature '-T6' properties of X7002 are presented for 4, 8, 10, 12, and 15 percent tensile prestraining. Discussions of the welding characteristics of the various alloys and intergranular, heat-affect zone ruptures of sub-zero X7002 tensile specimens are included also.

AD-611 378 Div. 26
CFSTI Prices: HC$3.00 MF$0.75

SKF Industries, Inc., Philadelphia, Pa.
A BASIC STUDY OF THE SLIDING CONTACTS IN ROLLING BEARINGS.
Progress rept. no. 3, 17 Oct 64-16 Jan 65,
by C. J. Belsky, K. Tataiah, A. Elshinnawy, W. E. Schmidt, and J. B. Waltrich. 16 Jan 65, 74p
Rept. no. AL65L009
Contract NOw64 0428c, Proj. 18 7, 19 1
Unclassified report

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Descriptors: (*Roller bearings, Quality control), Mechanical properties, Tolerances (Mechanics), Motion, Measuring devices (Electrical and Electronic), Data processing systems, Digital computers, Torque, Test equipment.

A new technique was developed for processing signals from the distance gage used in the measurement of skew and axial position of rollers in cylindrical roller bearings. The new method utilizes a small on-line computer to obtain average values of skew angles and axial positions of identified rollers as well as overall averages for all the rollers in the bearing. This method was used in processing previously tape recorded distance gage signals. Evaluation of the results showed two main causes for roller skew in the cylindrical roller bearing used in the tests: misalignment between the rolling paths of the inner and outer ring and cage pocket misalignment. Other causes will be investigated in subsequent work. Instrumentation was set up for simultaneous recording of roller skew data on two distance gages for the purpose of determining the correlation between roller skew and axial motion. The feasibility of using on-line and digital computers in the processing of the signals is being studied.

AD-611 418 Div. 26
CFSTI Prices: HC$1.00 MF$0.50

Laboratories for Research and Development, Franklin Inst., Philadelphia, Pa.
INVESTIGATION OF CONTAMINATION TOLERANCE LEVEL FOR HYDRAULIC PUMPS.
Quarterly technical rept. no. 1, 1 Oct 64-31 Jan 65,
by Richard H. Hollinger. 31 Jan 65, 9p
Rept. no. Q-B2289-1
Contract AF33 615 2009
Unclassified report

Descriptors: (*Hydraulic pressure pumps, Contamination), (*Contamination, Hydraulic pressure pumps), Tolerances (Mechanics).

Test systems were designed, and their construction was almost finished. Components include valves, sump, drive motor, torque reducer, and heat exchanger. The sump has a baffle plate on the inlet tube to prevent foam from entering the pump, possibly causing cavitation. The inlet tube is perforated so that the flow (24 gpm at 2400 psi operation) will give good mixing of contaminant with the hydraulic fluid without other agitation.

AD-611 420 Div. 26, 30
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson, Ohio.
METHOD OF OBTAINING HIGH AND ULTRAHIGH PRESSURES AND DEVICE FOR ITS REALIZATION,
by L. A. Yutkin and L. I. Gol'tsova. 15 Feb 65, 6p FTD-TT-64-965
TT 65-61760
Unclassified report

Unedited rough draft trans. of Russian patent 129945 (appl. no. 605995/25, 29 Dec 52) (pub. in Byulleten' Izobretenii i Tovarnykh Znakov (USSR) 1963, no. 20).

Descriptors: (*High-pressure research, Hydraulic systems), (*Hydraulic systems, High-pressure research), Electric discharges, Hydraulic fluids, Shock waves, Fluid mechanics, USSR, Patents.

A method of obtaining high and ultrahigh pressures as a result of electric pulse spark discharges in a liquid, forming electrohydraulic shocks is presented. The feature of the proposed method lies in the fact, that high and ultrahigh pressures in a liquid or any given mobile, plastic medium are obtained by the method of evaporation in it of current conductive elements in form of wire, band or pipe, closing the electrodes under the effect of pulse discharge, whereby the current conductive elements are bent in profile, in accordance with a given form, or it acquires the form of a conical or spherical spiral.

27. Propulsion Systems

AD-611 086 Div. 27
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ON QUESTION OF COMPARISON OF RADIAL CENTRIPETAL AND AXIAL STAGES OF TURBINES,
by P. V. Orekhov and V. P. Gavrikov. 26 Jan 65, 23p FTD-MT-64-261
TT 65-61720
Unclassified report

Edited machine trans. of Akademiya Nauk SSSR. Institut Dvigatelei. Trudy, 1962, v. 6, p. 61-75.

Descriptors: (*Turbines, Analysis), Axial-flow turbines, Gas turbines, Performance (Engineering), Design, Effectiveness, Tables, USSR.

Topics include: heat drop of radial and axial stages of a turbine; efficiency of radial centripetal and axial stages of turbines; variable guide vane apparatus; designing and manufacture of wheels; stages of axial and radial turbines with low consumption actuating medium through turbine.

developed by the U. of Cal. Radiation Laboratory. This code uses a numerical differencing method with injection of a 'Q-term' of artificial viscosity whenever an incipient shock condition develops. The addition of the 'Q-term' in appropriate amounts prevents a discontinuity so that the computer program can then handle the shock condition and determine when and where it will develop as well.

AD-611 137 Div. 27, 9, 25
CFSTI Prices: HC$3.00 MF$0.75

Hiller Aircraft Corp., Palo Alto, Calif.
INVESTIGATION OF THE PROCESS OF ENERGY TRANSFER FROM AN INTERMITTENT JET TO SECONDARY FLUID IN AN EJECTOR-TYPE THRUST AUGMENTER.
Final interim summary rept. for 30 Oct 62-31 Mar 64, by Raymond M. Lockwood and Harry W. Sander.
31 Mar 64, 99p Rept. no. APR-64-4
Contract Nonr308200
Unclassified report

See also AD-415 860.

Descriptors: (*Thrust augmentor nozzles, Heat transfer), Thermometers, Energy, Programming (Computers), Pulsejet engines, Shock waves, Jets, Thrust, Numerical analysis, Digital computers, Graphics, Flow visualization, Calibration, Test equipment.

Besides application of high-speed temperature measuring instrumentation, a search was made for a digital computer program that could be adapted to the problem. This resulted in the evaluation of the KO code

AD-611 282 Div. 27, 10, 25
CFSTI Prices: HC$1.00 MF$0.50

Rocketdyne, Canoga Park, Calif.
A STUDY OF HEAT TRANSFER CHARACTERISTICS OF HOT GAS IGNITION.
Quarterly progress rept. no. 3 for period ending 31 Jan 65,
by L. W. Carlson. 8 Feb 65, 25p
Rept. no. RM-1123/362
Contract AF04 611 9884 Unclassified report

See also AD-608 389.

Descriptors: (*Rocket igniters, Heat transfer), (*Heat transfer, Rocket igniters), Gases, Heaters, Gas flow, Rocket motors (Solid propellant), Nozzles, Therodynamics, Performance (Engineering), Model tests, Temperature, Fluid dynamics.

34 recorded heat transfer tests were performed. A number of interesting heat transfer effects were observed as follows: (1) developed heat transfer matches Dittus-Boelter type correlations, (2) transient heat transfer exists within the test section for a time duration of a large fraction of a second, (3) heat transfer maxima related to periodic shock phenomena within the test section chamber can occur, (4) data from shorter L/D tests are reproducibly coincident with the entrance data for longer L/D test sections, except for exit nozzle shock effects which persist in some cases for approximately two diameters back into the test section, (5) L', the nozzle extension distance within the test section, is not a significant parameter; it merely shifts the entire heat transfer distribution, (6) the exhaust area ratio is a significant parameter in determining the heat transfer level; the effect is related to jet aspiration or pressurization of the test chamber volume, (7) an axial head end super-sonic nozzle (optimum expansion) shifts the point of maximum heat transfer downstream to the center of the test section, while maintaining equivalent integrated heat transfer, compared with sonic igniter nozzles; greater shock disturbances were noted for the supersonic igniter nozzle at the aft end of the test section than were noted for the sonic igniter nozzle. (Author)

28. Psychology and Human Engineering

AD-610 833 Div. 28
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
FOUR TYPES OF LEARNING: A PHENOMENOLOGICAL ANALYSIS,
by Nehemiah Jordan. 19 Jan 61, 30p P-2199
Unclassified report

Descriptors: (*Learning, Theory), (*Social psychology, Learning), Children, Adults, Behavior, Motor reactions, Perception (Psychology), Training.

In this paper learning is treated at a relatively low level of abstraction. The learning processes are abstracted from the phenomenal given, leaving open the more basic question of whether there is a unique process underlying all learning phenomena or not. A learning process found in the developing child, called maturational learning, is distinguished from the learning process found in an adult. In addition, three learning processes common to children and adults are considered: (1) learning to do things, (2) acquiring knowledge, and (3) learning to get along with people or in groups.

AD-610 843 Div. 28
CFSTI Prices: HC$2.00 MF$0.50

Stanford Univ., Calif.
EFFECT OF GROUP SIZE ON GROUP PERFORMANCE.
Technical rept. no. 101,
by Herbert Solomon. 26 Oct 64, 31p
Contract Nonr22552, Proj. NR342 022
Unclassified report

Descriptors: (*Group dynamics, Behavior), (*Decision making, Group dynamics), Recall, Performance (Human), Verbal behavior, Mathematical models, Sampling, Statistical tests, Learning, Experimental data.

The efficiency of groups over individuals in various problem-solving situations has been explored in recent years. Lorge and Solomon have proposed a model for group behavior in the solution of eureka type problems. This model has been applied to data resulting from a verbal recall experiment. A model for individual behavior in recall has been proposed by Miller and McGill and this has been used to establish a group behavior model in verbal recall using the Lorge-Solomon model. Data has been available by experimentation and the implications of the model are examined by use of the data. The group sizes examined are from 2 through 6 individuals. One major motivation for this type of analysis is the management problem of how to allocate individuals into groups for solutions of staff problems. The work of Restle and Davis on interference models is also discussed and the implications of their work for analysis of the experimental data reported here are discussed. (Author)

AD-610 860 Div. 28
CFSTI Prices: HC$2.00 MF$0.50

ECTRONIC Systems Div., Air Force Systems Command, Bedford, Mass.
A TECHNIQUE FOR OBTAINING NON-DICHOTOMOUS MEASURES OF SHORT-TERM MEMORY,
by James D. Baker. Dec 64, 49p ESD TR-64-678
Proj. 4690, Task 469003
Unclassified report

See also AD-437 917.

Descriptors: (*Memory, Psychometrics), (*Psychometrics, Memory), Behavior, Recall, Learning, Human engineering, Probability, Decision theory, Performance (Human), Experimental data.

Performance measures in short-term memory (STM) generally use dichotomous scores as indicants of a process which is assumed to be continuously distributed. The purpose of this paper is to describe a technique for measuring STM which is not based upon dichotomous scoring criteria. The conceptual framework of this technique is derived from current theoretical developments in the measurement of subjective (personal or intuitive) probabilities. An STM feasibility study was conducted to assess this approach. Performance measures were obtained using a device that produced response vectors. These response vectors were transformed into equivalent dichotomous scores and uncertainty measures. The derived dichotomous data were compared to data obtained from equivalent, dichotomously scored studies. This comparison showed no deleterious effects on recall when this response mode was used. The uncertainty measures showed well-defined evidence of the effects of proactive inhibition in this task. Confidence judgments were derived from the response vectors. These derived confidence judgments were found to be at least as good, in terms of realism of confidence measures, as several existing techniques for obtaining confidence judgments directly. (Author)

AD-610 959 Div. 28
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
THE GENERALIZATION OF PERCEPTION,
by E. N. Sokolov. Mar 58, 16p T-256-R
TT 65-61657
Unclassified report

Trans. of Sovetskaya Pedagogika (USSR) 1952, v. 16, no. 9, p. 52-62.

Descriptors: (*Perception (Psychology), Learning), (*Conditioned reflex, Transfer of training), Sensory perception, Stimulation, Inhibition, Reasoning, Motor reactions, Language, Psychophysiology, USSR.

The problem of the generalization of perception is considered in terms of the relationship between the external object and perception (its subjective image). When we encounter a certain object or phenomenon, we compare it with other objects and phenomena. The comparison, which from the very beginning is generalized, thereafter is rendered more precise by the process of differentiation. But in all cases there is, corresponding to sensation and perception, not a single point stimulus but a whole series of stimuli, within the range of which series that stimuli are perceived as one. The reflection of reality by the organism has, in one degree or other, a generalized character. This generalization may take place on different levels, and reaches its highest development in human thought.

AD-611 056 Div. 28
CFSTI Prices: HC$3.00 MF$0.75

System Development Corp., Santa Monica, Calif.
OPTIMAL STIMULUS PRESENTATION STRATEGY FOR A STIMULUS SAMPLING MODEL OF LEARNING.
Professional paper,
by W. Karush and R. E. Dear. 24 Nov 64,
53p SP-1869
Unclassified report

Descriptors: (*Learning, Optimization), (*Optimization, Learning), (*Conditioned reflex, Optimization), Sampling, Stochastic processes, Mathematical models, Probability, Psychometrics.

In a process that involves learning through the presentation of stimulus items in a sequence controlled by the experimenter or teacher, it is of interest to determine rules of presentation (i.e., stimulus presentation strategies) that maximize the expected level of achievement of the subjects. An N-trial experiment is considered in which, at each trial, a stimulus item is chosen for presentation from among a given set of items. The learning model used is based on the stimulus-sampling theory of learning. This paper treats the case of two stimulus items and derives the following (among other) results for this case: (1) a proof of the optimality of a simple rule that essentially involves only the comparison of the values of the a posteriori probabilities that learning has been achieved for the stimulus items after each trial in the experiment; (2) a division of the unit square (representing initial values of the joint probability of being in a learned state for both items) into regions of common optimal presentation strategies. (Author)

AD-611 163 Div. 28, 15
CFSTI Prices: HC$3.00 MF$0.75

Institute for Mathematical Studies in the Social Sciences, Stanford Univ., Calif.
A PROBABILISTIC MODEL FOR FREE-RESPONDING. Doctoral thesis,
by M. Frank Norman. 14 Dec 64, 99p
Technical rept. no. TR-67
Grant AF AFOSR62 384
AFOSR 65-0288

Unclassified report

Descriptors: (*Mathematical models, Learning), (*Learning, Mathematical models), (*Behavior, Conditioned reflex), Probability, Real numbers, Measure theory, Recursive functions, Distribution theory, Transformations (Mathematics).

A free-responding (or 'free-operant') situation is one in which an organism is permitted to perform (or 'emit') a certain action (or 'response' or 'operant') repeatedly, at any times it chooses. In the free-operant situations considered in this paper, an animal (typically a rat or pigeon) is induced to perform this action (usually a lever press in the former case and a peck at a specified area or 'key' in the latter) by being tendered a reward (or '(positive) reinforcement' - a small amount of food, for instance) occasionally after the action is performed. B. F. Skinner ('Behavior of Organisms.' New York: Appleton-Century-Crofts,) discovered that various reward regimes (or 'schedules of reinforcement') generate distinctive behavior patterns in free-responding situations. Interest is centered around this phenomenon.

AD-611 180 Div. 28
CFSTI Prices: HC$4.00 MF$1.00

California Univ., Santa Barbara.
AN EXPERIMENTAL AND CONCEPTUAL EXAMINATION OF SEVERAL ASPECTS OF INTERPERSONAL BEHAVIOR,
by Charles G. McClintock. Jan 65, 120p
Contract AF49 638 794; Grant AF AFOSR62 347
AFOSR 65-0311

Unclassified report

Descriptors: (*Group dynamics, Behavior), (*Behavior, Social psychology), Leadership, Personality, Decision making, Motivation, Game theory, Probability, Psychometrics, Sociometrics, Theory.

Contents:
Leadership behavior
Cohesiveness
Risk-taking behavior
Game-playing behavior
Historical antecedents
Empirical studies of the Prisoners' Dilemma game
Social psychological theory and research
Conceptual basis of small group research

AD-611 187 Div. 28, 8, 25
CFSTI Prices: HC$3.00 MF$0.75

Hughes Aircraft Co., Fullerton, Calif. Ground Systems Group.
SHARED SPECTRUM DISPLAY ENHANCEMENT. Final rept.,
by James G. Rogers, Marvin H. Detambel, and Ann R. Bien. Jan 65, 67p Rept. no. FR-65-10-30
Contract AF19 628 3882
ESD TDR-64-673

Unclassified report

Descriptors: (*Visual perception, Colors), (*Colors, Display systems), (*Cathode ray tube screens, Visibility), (*Spectra (Visible and ultraviolet), Visual perception), Human engineering, Colorimetry, Illumination, Thresholds (Physiology), Light, Psychometrics, Visual acuity, Behavior, Vision, Reaction (Psychology).

An illumination system is described which utilizes for display, portions of the visible spectrum which have been excluded from the ambient light. The resulting tinted illumination is matched in brightness to a standard white light by experimental subjects, and stimulus threshold measurements made as a function of display intensity for various stimulus and ambient spectra. Certain combinations are found to lower the threshold of detection, indicating enhanced stimulus brightness, whereas others are found to raise the threshold. A close relationship is found between experimental data and results predicted on the basis of previously published increment-threshold measurements. (Author)

AD-611 190 Div. 28
CFSTI Prices: HC$4.00 MF$1.00

Institute for Defense Analyses, Washington, D. C.
THE 'THEORY' OF COGNITIVE DISSONANCE,
by Nehemiah Jordan. Nov 64, 143p
Rept. nos. IDA/HQ-64-2956, Internal Note N-219

Unclassified report

Descriptors: (*Behavior, Theory), Motivation, Decision making, Social psychology, Attitudes, Reasoning, Group dynamics, Psychometrics, Reaction (Psychology), Stress (Psychology), Reviews.

A critical review is presented of the formulation, the experimental basis, and recent modifications of a theory in behavioral psychology known as cognitive dissonance. Thirty-seven experiments conducted by scientists in support of the 'theory' are analyzed to determine to what extent they confirm or disconfirm it. The author concludes that the 'theory' has neither theoretical nor empirical substance and contributes very little to an understanding of cognition and motivation.

AD-611 192 Div. 28
CFSTI Prices: HC$1.00 MF$0.50

Texas Univ., Austin.
THE REPRESSION-SENSITIZATION SCALE: II. CONCURRENT AND CONSTRUCT VALIDITY,
by Donn Byrne. 1960, 15p
Contract AF49 638 460
AFOSR 146

Unclassified report

Descriptors: (*Test construction (Psychology), Adjustment (Psychology)), (*Adjustment (Psychology), Test construction (Psychology)), Projective techniques, Correlation techniques, Perception (Psychology), Personality, Behavior, Abnormal psychology, Anxiety, Verbal behavior, Emotions, Psychometrics.

A series of studies were undertaken in order to begin the establishment of construct validity for the Repression-Sensitization Scale. It was found that the R-S Scale is negatively correlated with Ullmann's Facilitation-Inhibition Scale; positively correlated with Worchel's Self Activity Inventory; negatively correlated with the California F Scale; positively related to the expression of sexual responses on the TAT for male Ss only and unrelated to the expression of aggression and emotionality for either sex; positively correlated with deviant response bias on an Adjective Check List; and unrelated to measures of intellectual ability. Thus, with minor exceptions the findings confirmed the general hypothesis that the R-S Scale is a measure of defensive behavior.

AD-611 288 Div. 28
CFSTI Prices: HC$3.00 MF$0.75

George Washington Univ., Washington, D. C.
A TEST OF MILIEU EFFECTS WITH SOME OF PIAGET'S TASKS,
by Jacqueline J. Goodnow. 1961, 70p
Contract AF49 638 682
AFOSR 1801

Unclassified report

Descriptors: (*Psychometrics, Children), Education, Culture, Intelligence tests, Perception (Psychology), Performance (Human), Reasoning, Hong Kong.

Approximately 500 European and Chinese boys between the ages of 10 and 13 were given four Piaget tasks (combinatorial reasoning, conservation of space, weight and volume), and Raven's Progressive Matrices (generally regarded as an intelligence test). Among the Chinese boys education varied from little or none to full schooling. Similarities across milieus were more striking than differences: there was an odd lack of relationship between the combinatorial task (closely tied to Matrices performance) and the conservation tasks (no such tie); replication of Geneva results was fair to good; the differences occurring suggest a need for a closer look at the concept 'stability of reasoning' and at the expected inter-relationships among various tasks.

AD-611 358 Div. 28

Texas Univ., Austin.
THE REPRESSION-SENSITIZATION SCALE: RATIONALE, RELIABILITY, AND VALIDITY,
by Donn Byrne. 27 Jan 61, 18p
Contract AF49 638 460
AFOSR 145

Unclassified report

Pub. in Journal of Personality (U. S.) v29 n3 p334-49 Sep 1961 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Psychometrics, Reliability), (*Behavior, Psychometrics), Perception (Psychology), Stimulation, Emotions, Anxiety, Motivation, Personality, Adjustment (Psychology), Projective techniques, Test construction (Psychology), Correlation techniques.

Work in the area of perceptual defense has led to the concept of a behavior dimension comprising psychological defenses ranging from repression to sensitization. Several scales of the MMPI have been found to be related to this dimension, and the present test consists of a combination of six of these scales. In a college population, the coefficient of internal consistency was found to be .88, and the coefficient of stability was also .88. Normative data were presented. A series of studies were undertaken in order to contribute to the establishment of concurrent and construct validity for the repression-sensitization scale. It was found that the R-S scale is negatively correlated with Ullmann's Facilitation-Inhibition scale; positively correlated with self-ideal discrepancy and with negative self description but unrelated to ideal-self descriptions; negatively correlated with the California F scale; positively related to the expression of sexual responses on the TAT for male Ss only and unrelated to the expression of aggression and emotionality for either sex; positively correlated with deviant-response bias on an Adjective Check List; and unrelated to measures of intellectual ability.

AD-611 459 Div. 28

University Coll., London (England).
RESPONSE INSTRUCTIONS AND THE SPEED OF RELATIVE JUDGEMENTS. II. PITCH DISCRIMINATION,
by C. P. Wallis and R. J. Audley. 6 Mar 63, 12p
Grant AF EOAR62 69
AFOSR 65-0293

Unclassified report

Pub. in British Journal of Psychology v55 n2 p121-32 1964 (Copies available only to DDC users).

Descriptors: (*Pitch discrimination, Psychometrics), (*Audiofrequency, Sound pitch), (*Sound pitch, Pitch discrimination), Reasoning, Reaction (Psychology), Psychophysiology, Correlation techniques, Great Britain.

Subjects were required to make easy pitch discriminations at four frequency levels. In a counter-balanced design, for half their judgements they were required to choose the higher of the pair of tones, and for the other half, the lower. It was found that subjects were quicker at choosing the higher than the lower of two high tones, but quicker at choosing the lower than the higher of two low tones. This 'cross-over' effect was found to be graded across the stimulus levels intermediate in the series, the intersection point being somewhat below the geometric mean of the series of frequencies used. While latencies tended to decrease during the course of an individual session, the cross-over effect was consistently observable in an analysis that controlled for such practice effects. Whether the tone responded to was the first or the second of the pair discriminated was found to be a significant variable. The 'cross-over' phenomenon was only consistently effective when the second tone was chosen. Linking these findings to similar phenomena previously demonstrated in brightness discrimination, theoretical suggestions are advanced which are relevant to all judgemental processes. (Author)

29. Quartermaster Equipment and Supplies

AD-611 224 Div. 29, 20
CFSTI Prices: HC$3.00 MF$0.75

Stanford Research Inst., Menlo Park, Calif.
RADIOACTIVITIES PRODUCED IN FOODS BY HIGH-ENERGY ELECTRONS,
Rept. no. 17 (Final), 15 Jan 58-14 Jan 62,
by H. D. Smith. 15 Mar 62, 55p
Contract DA19 129QM1100, Proj. SU2424
DSSC S-572

Unclassified report

Descriptors: (*Irradiated foods, Radiation hazards), (*Radioactivity, Irradiated foods), Gamma rays, X rays, Electrons, Packaging, Containers, Radioactive isotopes, Gamma counters, Purification, Preservation, Ionization, Processing.

An extensive current research effort is devoted to developing radiation processing of foods. With this type of food processing it might be possible to induce radioactivities in the foods which would impair their general wholesomeness. To determine whether or not such processing represents a potential health hazard, SRI has pursued a program for the past four years to establish the levels of induced radioactivities in foods. One part was concerned specifically with radioactivities induced by the (gamma, gamma-prime) reaction in foods irradiated with gamma rays and x-rays of several energies. The other part of the program considered radioactivities induced by a variety of reactions during irradiation by high energy electrons. Phase I of this program measured the activity induced by 24-mev electrons. Phase II, reported here, extended the program to cover several foods and a wider range of energies (6 to 25 mev).

AD-611 228 Div. 29, 22
CFSTI Prices: HC$1.00 MF$0.50

Food and Drug Administration, Washington, D. C.
EFFECTS OF NUCLEAR EXPLOSIONS ON FROZEN FOODS,
by H. P. Schmitt. Mar 56, 15p
Proj. 32 5
WT 1215

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55. Prepared in cooperation with Federal Civil Defense Administration, Battle Creek, Mich.

Descriptors: (*Nuclear explosion damage, Frozen foods), (*Frozen foods, Nuclear explosion damage), Containers, Food, Storage, Packaging, Environmental tests, Nutrition.

Samples of frozen foods representing major pack items and container types currently in use were exposed to the effects of a nuclear explosion on May 5, 1955, at the Nevada Test Site of the Atomic Energy Commission as part of Operation Cue of the Federal Civil Defense Administration. Exposure was made at close-in positions and in freezers located in homes. Recovered samples were found to be free of physical and thermal damage. Kinesthetic evaluation proved the retention of flavor, color, appearance, and texture. Scientific tests indicated the retention of vitamins, minerals, and proximate composition at all exposures well within ranges observed during good commercial manufacture. Samples from exposures in homes were recovered free of induced radiation. It is concluded that, under emergency conditions similar to this exposure, frozen foods may be used for both military and civilian feeding. (Author)

AD-611 315 Div. 29, 20, 22
CFSTI Prices: HC$3.00 MF$0.75

Food and Drug Administration, Washington, D. C.
THE EFFECT OF NUCLEAR EXPLOSIONS ON SEMIPERISHABLE FOODS AND FOOD PACKAGING,
by Robert E. Hardenburg and A. Lloyd Ryall.
Feb 56, 60p
Proj. 32 4
WT 1214

Unclassified report

Rept. on Operation Teapot Nevada Test Site, Feb-May 55.
Prepared in cooperation with Federal Civil Defense Administration, Battle Creek, Mich.

Descriptors: (*Nuclear explosion damage, Food), (*Food, Radiation effects), Packaging, Vulnerability, Explosion effects, Experimental data, Tables, Photographs.

Semiperishable foods were exposed to two atomic shots. Ten types of semiperishable products (apples, oranges, potatoes, onions, raisins, dry beans, dry milk, cereals, flour, and candy) were exposed at distances of 1/4 mile to 2 miles from the blast. Foods were placed in trenches at approximately 1270 and 2750 ft and were covered with 1 to 2 in. of soil. At the close-in buried positions many types of food packages were partially crushed; some were broken, and their contents were contaminated with radioactive dirt. A high percentage of the apples, potatoes, onions, and oranges were severely crushed and bruised at the 1270-ft location, greatly reducing their possible food value in an emergency. As a result of the mechanical damage to the produce, decay during subsequent storage was much higher than in non-exposed produce. Many of the semiperishable foods recovered from the 1270- and 2750-ft trench positions were radioactive from the initial neutron bombardment. This was mostly induced radioactivity, rather than the surface type of contamination from fall-out. Most of this induced radioactivity decayed within 3 to 4 days, and food in intact packages could then be used, if needed in an emergency.

AD-611 316 Div. 29, 16, 20
CFSTI Prices: HC$1.00 MF$0.50

Food and Drug Administration, Washington, D. C.
THE EFFECT OF NUCLEAR EXPLOSIONS ON COMMERCIALLY PACKAGED BEVERAGES,
by E. Rolland McConnell, George O. Sampson, and John M. Sharf. Mar 56, 18p
Proj. 32 2a
WT 1213

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.
Prepared in cooperation with Federal Civil Defense Administration, Battle Creek, Mich.

Descriptors: (*Beverages, Nuclear explosion damage), (*Radiation effects, Beverages), (*Nuclear explosion damage, Beverages), Blast, Containers, Glass, Steel, Pressure, Radiological contamination, Radioactivity.

The plans for Operation Teapot, at the Nevada Proving Grounds during 1955, included a series of Civil Effects Tests, one of which, covered the exposure of packaged food products. It was expanded to cover representative commercially packaged beverages, such as soft drinks and beer, in glass bottles and metal cans. Preliminary experimental results were obtained from test layouts exposed to a detonation of approximately nominal yield. Extensive test layouts were subsequently exposed during Operation Cue, of 50 per cent greater than nominal yield,

at varying distances from Ground Zero. These commercially packaged soft drinks and beer in glass bottles or metal cans survived the blast overpressures even as close as 1270 ft from Ground Zero, and at more remote distances, with most failures being caused by flying missiles, crushing by surrounding structures, or dislodgment from shelves. Induced radioactivity, subsequently measured on representative samples, was not great in either soft drinks or beer, even at the forward positions, and these beverages could be used as potable water sources for immediate emergency purposes as soon as the storage area is safe to enter after a nuclear explosion. Although containers showed some induced radioactivity, none of this activity was transferred to the contents. (Author)

AD-611 327 Div. 29, 20
CFSTI Prices: HC$1.00 MF$0.50

Food and Drug Administration, Washington, D. C.
EXPOSURE OF FOODS AND FOODSTUFFS TO NUCLEAR EXPLOSIONS (A SUMMARY OF RESULTS),
by Edwin P. Laug. May 56, 17p
WT 1222; AD 119 370 canceled

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.
Prepared in cooperation with Federal Civil Defense Administration, Battle Creek, Mich.

Descriptors: (*Food, Nuclear explosion damage), (*Nuclear explosion damage, Food), (*Radiation effects, Food), Containers, Packaging, Blast, Meat, Radiological contamination.

Over 100 different foods frequently used in the American diet were exposed to the effects of an atomic explosion. In addition 19 elements known to occur in food were exposed as pure salts, dry and in aqueous solutions. Exposure stations represented a variety of storage conditions and ranged from 1050 to 15,000 ft. from Ground Zero. All foods and their containers became more or less radioactive when exposed within one-fourth mile of Ground Zero.

AD-611 328 Div. 29, 20
CFSTI Prices: HC$2.00 MF$0.50

Food and Drug Administration, Washington, D. C.
EFFECTS OF NUCLEAR EXPLOSIONS ON BULK FOOD STAPLES,
by Sumner C. Rowe. Mar 56, 37p
Proj. 32 1
WT 1163; AD 119 421 canceled

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.
Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC. Copy is available for public sale.
Prepared in cooperation with Federal Civil Defense Battle Creek, Mich.

Descriptors: (*Food, Nuclear explosion damage), (*Nuclear explosion damage, Food), (*Radiation effects, Food), Containers, Packaging, Blast, Radiological contamination.

Twenty-eight different selected packaged foods representing those of greatest volume in the American diet were exposed to nuclear detonations at the Nevada Test Site during the spring of 1955. The foods were divided into three groups: retail size packages, replicas of bulk packages, and bulk sizes (50 to 100 lb.) The different packages were so placed that some were exposed to strong neutron and gamma flux, others to gamma radiation and blast effects, and still others to only blast effects. The foods were recovered as soon after exposure as feasible and were studied periodically for induced radioactivity, physical and chemical changes, organoleptic variations, nutritional adequacy, and toxicity. These studies showed that most foods were suitable for emergency feeding at presently suggested AEC tolerances within 15 days after exposure. The initial predominant radioactivity, in most cases, was demonstrated as resulting from sodium or potassium or both; the intermediate studies suggested phosphorus as the substance contributing the major portion of the radioactivity; and, in the final phase of the study, possibly the radiation effects on chlorine and trace elements predominated.

AD-611 329 Div. 29, 20
CFSTI Prices: HC$2.00 MF$0.50

Food and Drug Administration, Washington, D. C.
THE EFFECT OF NUCLEAR EXPLOSIONS ON MEAT AND MEAT PRODUCTS,
by Robert H. Philbeck and Delbert M. Doty.
Apr 56, 41p
Proj. 32 3
WT 1216; AD 119 422 canceled

Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55.
Prepared in cooperation with Federal Civil Defense Administration, Battle Creek, Mich.

Descriptors: (*Meat, Radiation effects), (*Radiation effects, Meat), Nuclear explosions, Radioactive fallout, Containers, Odors, Taste, Animals, Nutrition.

Two general types of meats and meat food products were exposed to nuclear explosions: (1) Processed types able to withstand slightly elevated temperatures, and consisting of Smithfield type hams, dried beef, sliced bacon, dry sausage, and lard. These products were exposed at current ambient temperatures. (2) Fresh and cured chilled meats, consisting of beef rounds, pork loin, leg of lamb, veal, ham, loin steaks, bologna, and frankfurters. These products were exposed under refrigeration maintained with dry ice. With respect to the first types, exposure at 1100 ft from a shot of approximately nominal yield induced marked radioactivity in all products except the lard. This appeared to be due to the high salt content resulting from the curing operation. Odor, taste, and appearance were not adversely affected. There was evidence of destruction of riboflavin and of an effect on rancidity development. With respect to the second types, exposure at 1270 ft from a shot with a yield approximately 50 per cent greater than nominal did induce radioactivity but at a lower level than in the high salt processed products. Visual and organoleptic evaluation of the perishable meats indicated that the exposed samples did not differ greatly from the unexposed in acceptability and nutritive quality. (Author)

30. Research and Research Equipment

AD-610 829 Div. 30, 26
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
SYSTEMS DESIGN FOR MANAGEMENT AUTOMATION,
by J. A. Postley. 28 Aug 59, 11p P-1783
Unclassified report

Descriptors: (*Systems engineering, Management planning), (*Management planning, Systems engineering), Automation, Data processing systems, Communication theory.

Automatic data processing systems are defined as those systems which encompass the functions of introducing information into a management system, storing it into automatic files, processing it automatically, and making the results available where they are required in the system. Systems design is defined as the detailed specification of the information flow which must occur within the given organizational framework. The nature and purpose of systems design are described, as are the environment which must be created so that it can take place and some of the newly known procedures which the design involves. The conclusions are that the problems of applying scientific disciplines and automatic techniques to management-type operations require changes in the techniques for designing the corresponding systems. The capability to design these systems requires the simultaneous consideration of functional interactions and great detail within each function, this requirement imposing a demand for new skills in systems design.

AD-610 834 Div. 30
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
WHAT IS DETAB-X.
Memorandum,
by Solomon L. Pollack. Oct 62, 27p P-2608-1
Unclassified report

Presented at the GUIDE Meeting of the CODASYL Development Committee in Philadelphia, Pa., 1-2 Nov 62.

Descriptors: (*Programming languages, Feasibility studies), Decision theory, Control sequences, Programming (Computers), Data processing systems, Commerce.

The Air Force, like many other large users of computers, continually seeks to reduce its computer programming staffs, costs, and time-lags. Toward this end, it has been exploring the use of computer-independent languages for describing its problems. This memorandum describes one of the latest of these languages, DETAB-X (Decision-Tables, Experimental). In an effort to illustrate some of the features of DETAB-X it is compared with COBOL-61 (Common Business-Oriented Language), using examples of data and procedures written in both languages. (Author)

AD-610 850 Div. 30
CFSTI Prices: HC$2.00 MF$0.50

Instrumentation Lab., Mass. Inst. of Tech., Cambridge.
ANALYZING RELIABILITY DATA AND DESIGNING ACCEPTANCE TESTS,
by Cynthia Kolb Whitney. Oct 64, 39p E-1705
Contract AF04 694 553, Proj. 52-225
Unclassified report

Descriptors: (*Non-destructive testing, Statistical analysis), (*Statistical analysis, Non-destructive testing), Reliability, Quality control, Mathematical models, Numerical methods and procedures.

Persons designing testing programs to specify reliability functions and failure rates need theoretical means of assigning confidence intervals to the quantities obtained. Also, persons designing acceptance tests for items with unknown reliability functions need simple, general methods of test design which do not rely on the myriad specialized tables for specific mathematical models available in the literature. The two problems are really opposite ways of looking at the same theoretical structure. The theoretical structure is examined and solutions to the problems are posed. (Author)

AD-610 864 Div. 30, 22
CFSTI Prices: HC$3.00 MF$0.75

Technical Operations Research, Burlington, Mass.
EFFECTS OF HYPERVELOCITY IMPACTS ON MATERIALS.
Final rept. for 1 Feb-30 Oct 64,
by R. W. O'Neil, S. Holland, T. Holland, V. E. Scherrer, and H. Stevens. Jan 65, 98p
Contract AF33 615 1333
ML TR65-14
Unclassified report

Descriptors: (*Hypervelocity projectiles, Terminal ballistics), (*Test equipment, Hypervelocity projectiles), Hypervelocity guns, Electric currents, Voltage, Shock waves, Shock tubes, Helium, Schlieren photography, Mathematical models, Design, Materials, Impact shock, Experimental data.

The exploding-foil hypervelocity particle-acceleration technique is described. The dependence of the technique on specific geometrical factors in the gun and on discharge characteristics of the electrical storage system is reported. A semiquantitative theory for predicting the magnitude and time dependence of the most significant operative mechanisms was conceived for the exploding-foil gun. The program was divided into two phases. In the first phase of the work techniques were devised to measure accurately the parameters affecting particle acceleration. The second phase investigated the performance of a standardized gun model chosen for this study as a function of stored electrical energy and of actual input power. Good correlation was found to exist between particle velocity and power input rate. Preliminary measurements were made on the impacting mass at several energies in the experimental series. The feasibility of accelerating spherical particles with exploding-conductor technique was discussed. (Author)

AD-610 880 Div. 30, 6, 16
CFSTI Prices: HC$2.00 MF$0.50

Lockheed Aircraft Corp., Burbank, Calif.
INSTRUMENTATION TECHNIQUES FOR ANALYSIS OF CHARACTERISTICS OF ANIMAL SONAR PULSES.
14 Jan 65, 49p LR-1825
Contract Nonr368000
Unclassified report

Descriptors: (*Sonar pulses, Aquatic animals), (*Aquatic animals, Sonar pulses), (*Sonar sound

analyzers, Marine Biological noise), Echo ranging, Instrumentation, Auditory signals, Sound transmission, Oscilloscopes, Sea water, Broad band, Narrowband, Cetacea.

The following conclusions are offered: (1) The demonstrated effects of inhomogeneities of the transmission medium on airborne pulses, analogous to the inhomogeneities of sea water, probably relegates the active sonar signature of a water immersed target to a statistical description, i.e., single-pulse returns will evidence variations that must be detected by multiple samples. (2) The survival history and recently demonstrated target performance of several marine mammals strongly indicates their use of rapidly repeated pulses to utilize a 'pulse phoneme' principle. (3) The observable and measurable differences in some physical parameters of marine mammal sonar pulses suggests functional specificity related in some fashion to the biological needs and capabilities of a particular genus. (4) Zalophus appears to produce pulses of much narrower bandwidth than do cetacea. (5) The use of certain analysis methods outlined above may reveal classification techniques for relating functional behavior of cetacea on the basis of their echolocation mechanisms. (Author)

AD-611 007 Div. 30, 8, 25
CFSTI Prices: HC$1.00 MF$0.50

Coordinated Science Lab., Univ. of Illinois, Urbana.
A PHOTO-CURRENT SUPPRESSOR GUAGE FOR THE MEASUREMENT OF VERY LOW PRESSURES,
by W. C. Schuemann. Oct 62, 14p Rept. no. R-156
Contract DA36 039SC85122, Task 3 99 01 002
Unclassified report

Descriptors: (*Ionization gages, Low-pressure research), (*Suppressors, Ionization gages), (*X rays, Ionization gages), Pressure gages, Electromagnetic shielding, Electrons, Electric current, Photoelectrons.

An ionization gauge has been designed which removes the low pressure limitation due to x-rays found in conventional ionization gauges while maintaining a comparable sensitivity. In this gauge, an additional electrode establishes an electric field which repels photo-electrons ejected from the ion collector. A similar photo-current from the suppressor grid is prevented by shielding this electrode from the x-rays. Preliminary experimental results have verified the suppression of photo-currents; pressures as low as 2 x 10 to the minus 12th power Torr have been measured. (Author)

AD-611 044 Div. 30, 8
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
DEVICE FOR PRIMARY PROCESSING OF A SIGNAL,
by R. L. Drabkin. 2 Dec 64, 7p FTD-TT-64-423
TT 65-61712
Unclassified report

Unedited rough draft trans. of Russian patent 153943, (appl. no. 760481/26 9, 22 Jan 62).

Descriptors: (*Computers, Filters (Electromagnetic wave)), (*Filters (Electromagnetic wave), Design), Pulse amplifiers, Limiters, Electronic switches, Commutators, Pulse generators, Patents, USSR.

The invention involves a device for primary processing of a signal with subsequent measurement of the phase with fluctuation interferences which considerably exceed in level the signal received which contains a pulse shaper and which is distinguished by the fact that, for the purpose of assuring primary numerical processing of the signal and freeing the computer from the work of filtration, the indicated pulse shaper quantizing the signal is connected with the mentioned switches, connecting in turn each of four time channels to the outputs of which there are joined two reversible counters which give out information in code form onto a numerical computing machine. (Author)

AD-611 051 Div. 30
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
ELECTRIC RESISTANCE TENSOMETER,
by B. A. Galgovskii, B. M. Rakhman, and V. M. Zubkov. 28 Jan 65, 5p FTD-TT-64-872
TT 65-61698
Unclassified report

Unedited rough draft trans. of Russian patent 153138, appl. no. 668220/25, 27 May 60.

Descriptors: (*Tensiometers, Resistance (Electrical)), Design, High temperature research, Meters, USSR, Patents, Aluminum alloys, Titanium alloys.

Object of Invention: The electric resistance tensometer for measuring pressures and deformations at higher temperatures or in aggressive media, made in form of a wire or strip of alloy, containing titanium, characterized by the fact, that for the purpose of expanding the measurement boundaries into the zone of plastic deformations, it is made of a titanium/aluminum alloy, the Al content of which is 3 to 5%. (Author)

AD-611 057 Div. 30, 23
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
COMPUTER TECHNOLOGY AND APPLICATIONS TO EDUCATION.
Professional paper,
by I. R. Sternlicht and T. C. Rowan. 17 Sep 64, 20p
SP-1850
Unclassified report

Presented at the Operations Research Society of America, Honolulu, Hawaii, 17 Sep 64.

Descriptors: (*Computers, Reviews), (*Education, Computers), Operations research, Management engineering, Communication theory, Data processing systems, Documentation, Effectiveness.

The electronic computer, mainstay of an advanced information processing technology, is described as being central to the solution of information management and control problems in education. Current applications of computer and information system technology in schools and colleges are discussed in a state-of-the-art summary which includes a wide range of computer activities in school business accounting, student and faculty personnel accounting, administration and guidance, simulation and gaming, information retrieval, and research and instruction. Present applications of computer and information system technology to education are viewed as being limited in scope largely because of the lack of understanding by educators of the potential use of computers rather than technical problems. Contributing to the limitations in present usage is the fragmented approach to system design. A total systems approach is described as a more fruitful means of serving

the information needs of the administrator, teacher, counselor, student, and school business official. The prediction is made that current research and development programs in educational information systems and computer technology could lead to major changes in the form and substance of American education at both the school and college level. (Author)

AD-611 058 Div. 30, 28
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
THREE BRANCHES OF ARTIFICIAL INTELLIGENCE RESEARCH,
Professional paper,
by Aiko Hormann. 12 Nov 64, 12p SP-1858/000/01
Unclassified report

Presented before the IEEE Professional Technical Group on Electronic Computers, Orange County Chapter, Anaheim, Calif., 5 Nov 64.

Descriptors: (*Artificial intelligence, Scientific research), Bionics, Computers, Simulation, Computer logic, Programming (Computers), Cybernetics.

This paper outlines three current approaches to the problems of artificial intelligence research--simulation of human behavior in 'human-like' ways; achievement of efficient problem-solving behavior using techniques and procedures not necessarily like those used by humans; and improvement in the relationship between man and machine by an alteration in the division of labor between the two and by advances in man/machine communication. Examples are given of artificial-intelligence systems embodying the underlying principles of each branch. Some of the problems that remain to be solved in artificial intelligence research are specified. (Author)

AD-611 074 Div. 30
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
METHOD OF CALIBRATING ACCELERATION SENSING ELEMENTS WORKING IN PULSED CONDITION,
by K. E. Bogoslovskii and M. M. Korenchenko.
18 Jan 64, 5p FTD-TT-64-868
TT 65-61688
Unclassified report

Unedited rough draft trans. of Russian patent no. 159,668, appl. no. 777803/26-10, 9 May 62.

Descriptors: (*Accelerometers, Calibration), Shock tubes, Gas flow, Shock waves, Loading (Mechanics), Pistons, Motion, Measurement, USSR, Patents.

According to the proposed method, the acceleration sensing element is placed in the shock tube in a slip ring (piston) and by the magnitude of its displacement from the effect of gas dynamic pulsed load is determined the sensitivity of the sensing element. The device is made in the form of a tube consisting of a high pressure chamber, and a low pressure chamber, separated by a diaphragm. In the low pressure chamber the piston is placed with the acceleration sensing element. Upon attainment of a given pressure in the high pressure chamber, the diaphragm breaks and the shock wave, as it propagates over the low pressure chamber, activates the piston. The displacement magnitude of the piston is recorded by a photoelectric or an inductive sensing element connected into the circuit of the recording instrument.

AD-611 091 Div. 30, 25
CFSTI Prices: HC$1.00 MF$0.50

Naval Ordnance Lab., White Oak, Md.
THE APPLICATION OF MAGNETORESISTANCE TO HIGH-FREQUENCY MAGNETOMETERS,
by Ralph S. Hebbert, Michael Stern, and Henry R. Irons. 3 Aug 64, 17p NOLTR-64-145
Task 938 04 513T
DASA 1560
Unclassified report

Descriptors: (*Magnetometers, Metal films), (*Metal films, Magnetic properties), Nickel alloys, Iron alloys, Resistance (Electrical), Sensitivity, Attenuators, Electrical conductance, Magnetic amplifiers, X-band, Microwave frequency, Magnetic fields.

This report describes the magnetoresistance properties of evaporated permalloy films and their application to magnetometers with high frequency response. Response times of the order of nanoseconds are possible while sensitivities may be varied greatly by choice of composition, magnetic bias or eddy-current field shunts. The resistance variation with direction of magnetization is also observed with a.c. currents as high as x-band. It is concluded therefore that an a.c. magneto-resistive bridge (bridge frequency of the order of 1 GC) would provide a suitable magnetometer in the presence of strong electric fields or other disturbances. (Author)

AD-611 104 Div. 30, 2, 13
CFSTI Prices: HC$1.00 MF$0.50

Army Electronics Command, Fort Monmouth, N. J.
GEOLOGICAL INVESTIGATIONS RELATED TO SELECTION OF A VLF ANTENNA SITE, WHITE SANDS MISSILE RANGE, NEW MEXICO,
by John W. Walker. Oct 64, 18p Technical rept.
ECOM-2530
Proj. 1C0 14501B11A, Task 1C0 14501B11A 00
Unclassified report

Descriptors: (*Geological survey, Guided missile ranges), (*Guided missile ranges, New Mexico), (*Antennas, Guided missile ranges), Terrain, Hydrology, Rock (Geology), Soils, Propagation, Very low frequency, Site selection.

Results of a field reconnaissance of the geology and hydrologic conditions in the vicinity of the White Sands Missile Range, New Mexico, are presented. The findings are evaluated with respect to the selection of a site for an experimental VLF antenna which will be placed directly on the surface of the ground. Several rock types exposed on the missile range and various terrains are discussed. The most suitable of these is a cuesta area on the west flank of the San Andres Mountains exposing the San Andres limestone above the water table. Recommendations for more definitive geophysical evaluations of the area are presented. (Author)

AD-611 135 Div. 30, 16
CFSTI Prices: HC$1.00 MF$0.50

Michigan Univ., Ann Arbor. Coll. of Literature, Science, and the Arts.
PATTERN RECOGNITION AND INFORMATION PROCESSING.
Final rept.,
by W. P. Tanner, Jr. Jan 65, 6p Rept. no. 05626-1-F

Grant AF AFOSR367 63, Proj. 05626
AFOSR 65-0242

Unclassified report

Descriptors: (*Pattern recognition, Artificial intelligence), (*Data processing systems, Pattern recognition), Functions, Bionics, Central nervous system, Spinal cord, Cats, Electrical properties.

In the area of machine learning, work was initiated in applying techniques developed by Medgyessy (1961) to unsupervised adaptive pattern recognition. Medgyessy's univariate techniques were extended to the multivariate normal case, and preliminary work was begun on devising techniques to handle approximations to such functions. Another research effort concerned the classification of information-processing systems with special attention to the measurement of information processing capacity. Another investigation was initiated in which it was proposed to study current flow in the central nervous system. The first phase of this study involved an investigation of the impedance of the dorsal columns of the spinal cord. The experimental method involved passing a low frequency, non-stimulating current from a small electrode on the dorsal columns in the cervical cord of the cat.

AD-611 142 Div. 30, 2. 15
CFSTI Prices: HC$3.00 MF$0.75

Northern Univ., Evanston, Ill.
WHIRLPOOL, A COMPUTER PROGRAM FOR 'SORTING OUT' INDEPENDENT VARIABLES BY SEQUENTIAL MULTIPLE LINEAR REGRESSION,
by W. C. Krumbein, Betty T. Benson, and W. B. Hempkins. 1964, 54p Technical rept. no. TR-14
Contract Nonr122826, Task 389 135

Unclassified report

Descriptors: (*Programming (Computers), Least squares method), (*Least squares method, Programming (Computers)), (*Sequential analysis, Search theory), Analysis of variance, Geology, Mathematical models, Statistical analysis.

The problem of identifying those variables in some larger set that exert most control on a given dependent variable is encountered in many earth-science problems. A variety of methods is available for ranking independent variables in the order of their importance, and the procedure described here is based on a straightforward least-squares use of the general linear model. The method consists in taking the independent variables one at a time, two at a time, and so on, until all possible combinations are included. Thus, no assumptions are made about the 'significance' of any variable or combination of variables: the full output is presented to facilitate substantive evaluation. The program is designed as a data-search procedure, although it can be modified to include F tests and similar aspects of more formal statistical analysis if desired. This report describes the mathematical procedures involved, it illustrates the method with a geological example, and it includes instructions for program operation. A Fortran II listing of the program is given in an Appendix. (Author)

AD-611 149 Div. 30, 4, 8, 17, 25
CFSTI Prices: HC$3.00 MF$0.75

Naval Research Lab., Washington, D. C.
REPORT OF NRL PROGRESS.
Dec 64, 59p

Unclassified report

This rept. includes: High Field Losses in Piezoelectric Ceramics, by Paul L. Smith and A. D. Burbage; The Effects of Technique on the Reliability of Mechanical Impedance Measurement, by G. M. Remmers and R. O. Belsheim.

Descriptors: (*Ceramic materials, Piezoelectric effect), (*Acoustic impedance, Measurement), (*Naval research, Reports), Electric fields, Reliability, Electron guns, Modulation, Radio equipment, Antenna configurations, High-temperature research, Metallurgy, Alloys, Fatigue (Mechanics), Fluorescence, Crystal lattices.

Two articles are presented: High field losses in piezoelectric ceramics; and The effects of technique on the reliability of mechanical impedance measurement. Summaries are given of research in the following fields: chemistry, metallurgy, nuclear and atomic physics, radio, and solid state physics. Papers, published reports, and patents by NRL staff members are listed.

AD-611 211 Div. 30
CFSTI Prices: HC$1.25 MF$0.50

Watervliet Arsenal, N. Y.
THE EFFECTS OF HIGH PRESSURE ON FOIL STRAIN GAGES,
Technical rept.,
by R. V. Milligan. Nov 64, 47p WVT-6422
Proj. 1AO 13001AO39 26

Unclassified report

Descriptors: (*Strain gages, High-pressure research), (*High-pressure research, Strain gages), (*Foils, Strain gages), Hydrostatic pressure, Pressure vessels, Tungsten, Steel, Aluminum, Stresses, Mathematical analysis, Failure (Mechanics), Photomicrography.

This paper shows the effects of fluid pressures to 140 ksi on four different types of SR-4 foil-type strain gages. Linear pressure-strain curves were obtained for these gages mounted on flat surfaces of tungsten, steel and aluminum specimens. The inverse slope of the pressure-strain curves is compared with the compressibility constant 1-2 nu/E as calculated from experimentally determined values of E and nu. Experimental results show the percent deviation between the constants to be a function of the material, being greatest for tungsten and least for aluminum. Temperature effects, as a function of the rate of applied pressure, are investigated. The types of gage failures encountered along with photo-micrographs showing probable causes are presented. (Author)

AD-611 222 Div. 30, 14, 17, 20
CFSTI Prices: HC$2.00 MF$0.50

Air Force Materials Lab., Air Force Systems Command, Wright-Patterson AFB, Ohio.
AUTORADIOGRAPHY AND MATERIALS RESEARCH.
Rept. for Sep 62-Jun 64,
by Paul L. Faust and G. Wm. Lawless. Dec 64, 34p ML-TDR-64-318
Proj. 7312, Task 731202

Unclassified report

Descriptors: (*Autoradiography, Materials), Tracer studies, Test methods, Colloids, Radioactive isotopes, Radioactivity, Metals, Radiation hazards.

Autoradiography is defined and discussed and the 'wet-process' technique is outlined. Requirements on the characteristics of the radioactivity of specimen material are noted along with a discussion of the overall resolution obtainable. Some physiological aspects of tracer level (less than 3 Mev) radioactivity are considered and some experiments are cited illustrating the use of radioactive tracers in materials research. (Author)

AD-611 246 Div. 30, 20

Sandia Corp., Albuquerque, N. Mex.
TEST RESULTS FROM AUTOMATIC YIELD INDICATORS,
by M. Cowan, Jr., D. N. Munro, and H. H. Sander.
Oct 60, 44p
Proj. 43 10
WT 1737

Unclassified report

Rept. on Operation HARDTACK, Apr-Oct 58.
Available only for reference use at DDC Field Services.
Copy is not available for public sale.

Descriptors: (*Nuclear explosions, Measurement), (*Meters, Nuclear explosions), Shock waves, Pressure switches, Blast, Circuits, Performance (Engineering), Errors, Portable, Pressure.

Automatic yield indicators which operate on the negative-phase duration principle have been developed. Yield estimates were obtained during Hardtack Phase I for five detonations at distances ranging from 11 to 25 miles. The greatest error in yield was obtained at 22.5 miles where the ratio of indicated yield to actual yield was about 2.5. For a lapse condition, it is estimated that automatic yield indicators will nearly always indicate within a factor of 2 or 3 of the actual yield within the range to 0.1 psi peak overpressure (about 30 miles for 1 mt). Under strong low-level temperature inversions (rapid increase in temperature with increase in height above the surface) at Nevada Test Site, automatic yield indicators functioned properly on 11 shots on Operation Hardtack, Phase II. Yields ranged from 0.62 ton to 6.5 kt and distances ranged from 2 to 13 miles. On eight of these events, indicated yields were within a factor of 2 of actual yields. Greater errors on the three other events were caused by interference effects resulting from the inversion conditions. This and other blast-wave measurements indicate that factor-of-2 yield estimates can be obtained by the AYI about 70 percent of the time under strong inversion conditions within the range of 0.1 psi. (Author)

AD-611 252 Div. 30, 2, 22
CFSTI Prices: HC$2.00 MF$0.50

Scripps Institution of Oceanography, Univ. of California, La Jolla.
PHYSICAL OCEANOGRAPHY OF THE TEST AREA,
by Paul L. Horrer. Aug 56, 40p
Proj. 2 8, pt. 2
WT 1019; ITR 1068 superseded

Unclassified report

Rept. on Operation Wigwam, May 1955.

Descriptors: (*Oceanology, Test facilities), (*Test facilities, Nuclear weapons), (*Ranges (Establishments), Pacific Ocean), Ocean currents, Transport properties, Radioactivity, Oceanographic data, Maps, Site selection, Oceanographic equipment.

The objectives of the project were (1) the selection, with Project 2.5, of a test site, (2) to provide information for prediction of phenomenology, and (3) to document the test with environmental information. Research cruises made to the general region during 1954 broadened available oceanographic knowledge about the area and enabled a tentative site selection and speculation on phenomenology. Final recommendations were based on oceanographic data collected in April 1955 and from 5 to 13 May 1955, just prior to the test. Results include: (1) contaminated waters moved westward from the test site at an average speed of about 0.1 knot (away from shore and fishing grounds), (2) dispersion of radioactivity at a given level was relatively slow during the first 10 days, but vertical current shear augmented its spreading, (3) depth of radioactivity measured at various times after the event appears intimately associated with stability or vertical density gradient in the water, and (4) at H = 0 the array and most ships of the Task Group were over relatively flat sea bottom, but a ridge 0.75 mile high existed about 5 miles south of Ground Zero. The low current speeds and movement of water away from land and ocean fishing grounds at the test area were desirable conditions, and, from an oceanographic viewpoint, the area can be recommended for future tests of similar magnitude. (Author)

AD-611 275 Div. 30, 18
CFSTI Prices: HC$4.00 MF$0.75

Air Force Inst. of Tech., Wright-Patterson AFB, Ohio.
MULTI-PROGRAM ORGANIZATIONS.
Master's thesis; Research paper,
by Klas Kendall Fenell. Oct 64, 101p
Rept. no. GSM/SM/64-7

Unclassified report

Available copy will not permit fully legible reproduction.
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Descriptors: (*Air force systems command, Systems engineering), (*Systems engineering, Air force systems command), Manpower studies, Military organizations, Multiple operation, Effectiveness, Management control systems, Management engineering, Operations research.

Multi-program organizations are utilized by the Deputy for Systems Management within the Aeronautical Systems Division as a device to reduce the span of control, to conserve critical manpower resources through consolidation of certain functions and to gain more flexibility in the use of these critical resources. Multi-program organizations currently in use are in the form of directorates and multiple System Program Offices and are required to efficiently manage the large number of assigned programs and projects. For the most part, these organizations have proven to be effective instruments for conducting systems management. Their effectiveness can be increased through continued emphasis on strong executive leadership and by correcting deficiencies in the environment within which these organizations must operate. (Author)

AD-611 307 Div. 30
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
SOVIET CYBERNETICS TECHNOLOGY: IV. DESCRIPTIONS OF THE MN-11, MN-M, AND MN-7 ANALOG COMPUTERS AND OF THREE MISCELLANEOUS ELECTRONIC DEVICES.
Memo.,
ed. and trans. by Wade B. Holland. Feb 65, 26p
Rept. no. RM-4461-PR
Contract AF49 638 700
TT 65-61755

Unclassified report

Trans. of 6 selected articles from 1959-61 Russian advertising brochures and includes a bibliography of RAND publications in Soviet cybernetics and computer technology.
See also AD-419 487.

Descriptors: (*Cybernetics, USSR), (*Analog computers, USSR), Specifications, Bibliographies.

This memorandum is a collection of translations detailing technical specifications of the MN-11, MN-M, and MN-7 Soviet analog computers, and of the BPZ-1 fixed-delay unit, the I-5 CRT indicator, and the VPRR-2 electronic device for controlling tooling modes. The material was collected and translated at The RAND Corporation as part of an effort to maintain an awareness of current developments in the Soviet computer field.

AD-611 334 Div. 30, 28
CFSTI Prices: HC$3.00 MF$0.75

Grafix, Inc., Albuquerque, N. Mex.
A GENERAL ADAPTIVE MOTOR LEARNING PROGRAM FOR A DIGITAL COMPUTER, PART I, SECTIONS I AND II.
Final technical rept.,
by Gene R. Bussey. 30 Dec 64, 99p
Contract AF49 638 1203
AFOSR 65-0275 P1

Unclassified report

See also AD-611 335.

Descriptors: (*Learning, Humans), (*Programming (Computers), Perception (Psychology)), (*Perception (Pschology), Simulation), (*Artificial intelligence, Programming (Computers)), Digital computers, Memory, Motor reactions, Machines, Cybernetics.

The goal of this research effort is the ultimate realization of a practical adaptive system which would be an adequate basis for a robot with manlike capabilities--say, one filling the role of man in an unhospitable space environment. Consequently, and effort has been made from the very beginning to incorporate the rudiments of all the major subsystems thought necessary and to attain a realistic drive subsystem of the complexity believed essential to an automation which not only has a variety of jobs to do but must in addition improve itself in general and take care of its physical needs. Because some successful work had already been done in the area of perception--particularly visual pattern and speech recognition--and because the bulk of research in the field is being done in the perceptual area, it was decided to concentrate on the effector or motor side of the adaptive system problem, with the perceptual processes being merely simulated at first by any practical means at hand. Ultimately, it is planned that adaptive processes will be programmed for such perceptual processes until finally a complete system incorporating adaptive processes for all sensori-motor and cortical processes would be realized.

AD-611 335 Div. 30, 28
CFSTI Prices: HC$4.00 MF$0.75

Grafix, Inc., Albuquerque, N. Mex.
A GENERAL ADAPTIVE MOTOR LEARNING PROGRAM FOR A DIGITAL COMPUTER, PART II, SECTIONS III AND IV.
Final technical rept.,
by Gene R. Bussey. 30 Dec 64, 107p
Contract AF49 638 1203
AFOSR 65-0275 P2

Unclassified report

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See also AD-611 334.

Descriptors: (*Learning, Humans), (*Artificial intelligence, Programming (Computers)), (*Programming (Computers), Perception (Psychology)), (*Perception (Psychology), Simulation), Digital computers, Memory, Motor reactions, Machines, Cybernetics.

The object of the research has been to achieve a working program that effectively demonstrates a general ability to learn non-specific motor tasks. Thus, the report consists of a working computer program. The program is described in detail with explanatory text keyed to flow charts. The program is given, along with instructions for running it.

AD-611 368 Div. 30, 24
CFSTI Prices: HC$1.00 MF$0.50

Technion - Israel Inst. of Tech., Haifa.
ANALOGUE ELECTRONIC REPRESENTATION OF STEREOSCOPIC VISION AND OF THE GEOMETRY OF MULTI-DIMENSIONAL SPACES: APPENDIX (FIGURES AND DIAGRAMS).
Final scientific rept.
31 Aug 64, 25p
Contract AF61 052 551
AFCRL 65-89-A; TT 65-61757

Unclassified report

See also AD-611 371.

Descriptors: (*Analog computers, Design), (*Stereoscopic display systems, Analog computers), (*Mechanical drawings, Analog computers), Circuits, Aerial photographs, Photographic intelligence, Photointerpretation, Nuclear reactions, Photographs, Mapping, Space perception, Images, Geometry, Analysis, Transformations (Mathematics), Mapping (Transformations), Data processing systems, Stereoscopic photography, Television cameras, Cathode ray tube screens, Programming (Computers), Israel.

AD-611 371 Div. 30, 24
CFSTI Prices: HC$4.00 MF$1.00

Technion - Israel Inst. of Tech., Haifa.
ANALOGUE ELECTRONIC REPRESENTATION OF STEREOSCOPIC VISION AND OF THE GEOMETRY OF MULTI-DIMENSIONAL SPACES.
Final Scientific rept.,
by F. Ollendorff, E. Hirsch, G. Friedman, and L. Shaudinishky. 31 Aug 64, 125p
Contract AF61 052 551
AFCRL 65-89; TT 65-61758

Unclassified report

Descriptors: (*Analog computers, Design), (*Stereoscopic display systems, Analog oomputers), Aerial photographs, Photographic intelligence, Photointerpretation, Nuclear reactions, Photographs, Transformations (Mathematics), Mapping (Transformations), Mapping, Mechanical drawings, Space perception, Images, Geometry, Analysis, Data processing systems, Stereoscopic photography, Television cameras, Cathode ray tube screens, Programming (Computers), Israel.

The study deals with the design of a geometrical electronic computer, whose function can be defined as mapping of an n-dimensional space into an m-dimensional one, where n > or = m. Data are fed to the computer by means of television cameras and delivered as images on television-tube screens. The possibility exists, in principle, of feeding and obtaining data by other means,

equivalent information-wise to a two-dimensional image, or - in one-dimensional cases - to a rectilinear set of points. Problems of interpreting engineering drawings, aerial photographs and nuclear reaction photographs are stressed as well as applications to solution of special mathematical problems. Emphasis is also placed on the analysis of the stereoscopic vision effect. (Author)

AD-611 432 Div. 30
CFSTI Prices: HC$8.25 MF$2.50

Department of the Army, Washington, D. C.
PROCEEDINGS OF THE 1964 ARMY SCIENCE CONFERENCE, UNITED STATES MILITARY ACADEMY, WEST POINT, N. Y., 17-19 JUNE 1964. VOLUME I. (PRINCIPAL AUTHORS 'A' THROUGH 'H')
22 Jan 65, 526p

Unclassified report

Descriptors: (*Army research, Reports), (*Scientific research, Army), Symposia, Fluid mechanics, Satellites (Artificial), Meteorology, Communication systems, Metallurgy, Organic compounds, Radar tracking, Plasma physics, Chemistry, Radar equipment, Reentry vehicles, Dielectric films, Optics, Gas turbines, Microwave equipment, Nuclear scattering, Defense systems, Tires, Lasers, Solid rocket propellants, Single crystals, Pneumatic systems, Semiconductors, Pathology, Bacteria, Infectious diseases.

Three invited papers presented at the 1964 Army Science Conference are included in Volume I: Medical trends in life support systems, by Lt. Col. T. G. Barila; Control, amplification and fluids, by B. M. Horton; and Army participation in project SYNCOM, by Brig. Gen. J. W. Johnston.

AD-611 434 Div. 30
CFSTI Prices: HC$1.00 MF$0.50

Computer Science Div., Stanford Univ., Calif.
AUTOMATIC GRADING PROGRAMS,
by George E. Forsythe and Niklaus Wirth.
12 Feb 65, 21p Rept. no. CS-17
Contract Nonr22537; Grant GP948, Proj. NR044 211

Unclassified report

Presented to the national meeting of the Association for Computing Machinery, Philadelphia, Pa., 27 Aug 64, under the title 'Automatic Machine Grading Programs'.

Descriptors: (*Computers, Teaching machines), (*Teaching machines, Computers), Programming (Computers), Numerical analysis, Training devices, Programming languages, Education.

The ALGOL grader programs are presented for the computer evaluation of student ALGOL programs. One is for a beginner's program; it furnishes random data and checks answers. The other provides a searching test of the reliability and efficiency of a rootfinding procedure. There is a statement of the essential properties of a computer system, in order that grader programs can be effectively used. (Author)

31. Ships and Marine Equipment

AD-610 924 Div. 31
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Canada).
SOME DATA ON THE HYDROFOIL MOTOR-VESSEL 'RAKETA' AND RESULTS IN OPERATION,
by N. N. Kolyshkin. Aug 60, 8p T-337-R
TT 65-61646

Unclassified report

Trans. of Sudostroeni (USSR) 1958, v. 24, no. 4(186) p. 1-4.

Descriptors: (*Hydrofoil boats, Performance (Engineering)), Power, Design, Hydrofoils, Propellers (Marine), USSR.

Data are given on the performance of a hydrofoil passenger boat designed to operate on a river. The information includes power plant requirements, fuel consumption, speed, sea state, and hydrofoil arrangement data. Overall design parameters are discussed and evaluated.

AD-610 939 Div. 31
CFSTI Prices: HC$1.00 MF$0.50

Directorate of Scientific Information Services, Ottawa (Ontario).
SHALLOW-DRAFT HYDROFOIL MOTOR VESSEL FOR PASSENGER SERVICE,
by A. Z. Mandel'. Jan 63, 6p T-378-R
TT 63-12799

Unclassified report

Trans. of Sudostroenie (USSR) 1962, v. 28, no. 8, p. 1-3.
Also available from NRC as C-4269.

Descriptors: (*Hydrofoil boats, Design), Performance (Engineering), Marine propulsion, Marine rudders, Propellers (Marine), Hydrofoils, USSR.

Design improvement of a hydrofoil passenger boat are given. The design differences effect the propulsion unit and the rudder. As a result of the design changes, tested under operating conditions, the basic operational technical indices (useful load, speed, steering qualities, power expenditure) of the shallow-draft hydrofoil vessel were brought practically up to the indices of the standard hydrofoil boat. Eliminating the housing over the propeller and the installation of two rudders instead of one removed the tendency for cracks to form in parts of the rudder and propulsion units. The reliability of the shallow-draft hydrofoil boat became better than that of the standard hydrofoil boat, the propeller of which is not protected.

AD-611 004 Div. 31
CFSTI Prices: HC$3.00 MF$0.75

David Taylor Model Basin, Washington, D. C.
SHIPBOARD VIBRATION RESEARCH IN THE U.S.A.
Research and development rept.,
by Edward F. Noonan. Dec 64, 81p DTMB-1891

Unclassified report

A rept. to the Vibration Committee (9) of the International Ship Structures Congress (2nd), Delft, The Netherlands, Jul 64.

Descriptors: (*Ship hulls, Vibration), Design, Ship noise, Measurement, Water waves, Impact shock, Elasticity, Bibliographies, Marine engineering.

A brief review of the Hull Vibration Program at the David Taylor Model Basin and of the HS-2-1 Task Group of the HS-2 Panel (Dynamic Loadings and Responses) of The Society of Naval Architects and Marine Engineers is given. A bibliography of selected reports and papers on ship and machinery vibration is included. Of particular note is the 'Code for Shipboard Hull Vibration Measurements.' This code is intended for use in the evaluation of commercial type ships and has received the approval of the Hull Structure Committee of SNAME. It has been published by The Society of Naval Architects and Marine Engineers as Technical and Research Bulletin No. 2-10. This publication was used as the basis of discussions on the subject of standard vibration measuring systems and procedures for shipboard hull vibration measurements, at the 2nd International Ship Structures Congress, held at Delft, the Netherlands, July 1964. (Author)

AD-611 186 Div. 31, 9, 25
CFSTI Prices: HC$4.00 MF$1.00

General Electric Co., Schenectady, N. Y.
SOUND TRANSMISSION THROUGH FLUID PIPING SYSTEMS.
Final rept.,
by R. B. Tatge, R. J. Wells, M. W. Schulz, and G. M. Rentzepis. Aug 64, 148p
Contract N161 25389, Proj. S F013 11 08, Task 1359
MEL 207-64

Unclassified report

Descriptors: (*Sound transmission, Pipes), (*Pipes, Fluid flow), (*Submarine noise, Pipes), Correlation techniques, Differential geometry, Underwater sound, Pumps, Noise analyzers, Hydrophones, Stresses, Elasticity, Cylindrical bodies, Vibration.

A new pipe-wall transducer has been designed and built which either suppresses spurious responses, or automatically compensates for them so as to be able to accurately measure acoustic energy in fluid filled pipes. This development is a necessary prerequisite to any study involving measurements in piping systems. Sound propagation in fluid filled piping systems could be completely understood if it were possible to set up a mathematical analog of the system. Correlation analysis was chosen as a tool with which to investigate sound propagation in an actual piping system, with a goal of determining the relative importance of vibrational energy in the fluid column and in the pipe walls (to be differentiated by the difference in their propagation velocities), and of determining the reflection coefficient and phase angle associated with discontinuities in the piping system. In order to gain an understanding of the correlator records we have calculated correlator output for a number of idealized situations in order to determine the importance of such variables as bandwidth, spectrum shape, dimension, and termination impedance. The calculations allow for a complex propagation constant in a given medium, but do not consider flanking paths.

AD-611 367 Div. 31, 9, 15
CFSTI Prices: HC$2.00 MF$0.50

Oceanics, Inc., Plainview, N. Y.
FORCE DUE TO PROPELLER-DRIVEN JETS USED FOR SUBMARINE DEPTH CONTROL,
by Theodore R. Goodman and C. C. Chen.
Jan 65, 36p Rept. no. 64-18A
Contract NObs90265, Proj. SF013O103, Task 0202

Unclassified report

Descriptors: (*Submarines, Hydrodynamics), (*Jet propulsion, Submarines), Force (Mechanics), Propellers (Marine), Liquid jets, Underwater propulsion, Control systems, Depth indicators, Thrust, Submarine hulls, Momentum, Two-dimensional flow, Boundary value problems, Transformations (Mathematics), Mathematical models, Equations.

The hydrodynamic force is determined which acts on a submarine hull fitted with vertical propeller-driven jet devices. A two-dimensional potential flow model is assumed in the analysis. It is found that the location of the jet tubes plays an important role in determining the loss in thrust which may be expected due to the external flow. As the location of the jet tubes approaches the center, the loss increases. (Author)

AD-611 408 Div. 31, 13
CFSTI Prices: HC$3.00 MF$0.75

Naval Civil Engineering Lab., Port Hueneme, Calif.
ANALYSIS OF A TIMBER PIER AS LOADED DURING A HIGH LEVEL STORM.
Final rept.,
by Walter J. Tudor. Dec 64, 74p
Technical note no. N-578
Proj. Y F008 08 02 128, DASA14 083

Unclassified report

Descriptors: (*Piers, Storms), Wood, Wind, Water waves, Ocean currents, Loading (Mechanics), Damage, Floating bodies.

The intent of this report is to add to the meager knowledge of the effects on a pier exposed to storm excited winds, waves, currents, and floating debris. An analysis is made of a timber pier loaded to damage during a high level storm; specifically, the Municipal Fishing Pier at Ventnor, N. J., during storm of 5 - 9 March 1962. This analysis includes the response of a typical pier bent to static loading, to dynamic loadirg induced by collision with floating debris or the storm's wind, waves, and currents. It is concluded that significant damage could have resulted from collision with current-driven floating debris (a large steel tank) but not by the storm environment itself. The high water was below deck level for this storm and important waves broke shoreward of the damaged pier bents. (Author)

AD-611 410 Div. 31, 14, 17
CFSTI Prices: HC$1.25 MF$0.50

Naval Civil Engineering Lab., Port Hueneme, Calif.
PROTECTION OF MOORING BUOYS. PART V. FOURTd RATING INSPECTION.
Progress rept. for Feb-Sep 64,
by R. W. Drisko. 4 Jan 65, 46p
Technical rept. no. R-355 Unclassified report
Proj. Y R007 08 04 404
See also AD-411 426.

Descriptors: (*Mooring buoys, Protective treatments), (*Protective treatments, Mooring buoys), (*Corrosion inhibition, Mooring buoys), Plastic coatings, Antifouling coatings, Cathodic protection, Steel, Plastic paints, Epoxy plastics, Phenolic plastics, Polyester plastics, Effectiveness, Environmental tests, San Diego Bay.

This is the fifth of a series of reports on the protection of mooring buoys. Fourteen test buoys were given their fourth rating for extent of coating deterioration, corrosion of steel, and fouling. Another buoy was so deteriorated it was removed from test. Exposure periods vary for the buoys. The coating systems on eight of the buoys were in good condition and six showed varying degrees of moderate deterioration. Two sets of thirteen test panels coated with the systems used on the buoys were rated for the third time after 18 months exposure, and results showed a general correlation. Environmental corrosion is supplemented by abrasion of buoys by mooring naval vessels. Three of the buoys were cathodically protected with a sacrificial magnesium anode, a control head, and a zinc anode, united directly to the ground cable, was substituted for the magnesium and potentials were increased to the desired magnitude. (Author)

AD-611 426 Div. 31, 9
CFSTI Prices: HC$3.00 MF$0.75

Southwest Research Inst., San Antonio, Tex.
A THEORETICAL AND EXPERIMENTAL STUDY OF STRUCTURAL VIBRATION CHARACTEISTICS OF SUBMERGED HYDROFOILS. PHASE III-A: VIBRATION CHARACTERISTICS OF SEVERAL FULL-SCALE HYDROFOIL CRAFT,
by Jack T. Irick. Dec 64, 74p
Technical rept. no. TR-1
Contract N600 167 60477X, Proj. 02 1374

Unclassified report

Descriptors: (*Hydrofoil boats, Structural properties), (*Planing surfaces, Fluid dynamic properties), (*Marine engineering, Hydrofoil boats), Reviews, Design, Vibration, Theory, Experimental data.

The objective of this study is to determine and evaluate existing measured data on dynamic structural characteristics of several hydrofoil craft. It was found that a very small amount of data has been reported and that no comprehensive program to obtain such data is being planned for any of the hydrofoil craft considered. Certain of the procedures used in the design of these craft are also discussed. (Author)

32. Miscellaneous Arts and Sciences

AD-610 831 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
NATION BUILDING AND REVOLUTIONARY WAR,
by David A. Wilson. Sep 62, 14p P-2624
Unclassified report

Descriptors: (*Political science, Government (Foreign)), (*Government (Foreign), Stability), (*Communism, Asia), Social sciences, History, Southeast Asia, Guerrilla warfare, Leadership, Culture.

Social mobilization is discussed in terms of its significance in the building of nations. The success of revolutionary war in advancing the processes of social mobilization and subsequent nationhood is considered, particularly as it applies to the Communist advance in Asia.

AD-611 020 Div. 32

American Univ., Washington, D. C.
U. S. ARMY AREA HANDBOOK FOR GERMANY.
Second ed.,
by Norman C. Walpole, Marianne Baer, Lelah Dushkin, Neda A. Franges, and Lyman H. Legters, Jr. 25 Jun 64, 963p
DA PAM550-29
Unclassified report

Available from Superintendent of Documents, GPO, Washington, D. C., 20402, $4.00, as D101.22:550-29. First edition dated Jun 30.

Descriptors: (*East Germany, Handbooks), (*West Germany, Handbooks), Sociology, Political science, Economics, Armed forces (Foreign), Social sciences.

Contents:
Sociological Background
Political Background
Economic Background
Military Background.

AD-611 054 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Foreign Tech. Div., Air Force Systems Command, Wright-Patterson AFB, Ohio.
AGROCHEMICAL STATION,
by V. Ivanov. 26 Jan 65, 11p FTD-TT-64-957
TT 65-61701
Unclassified report

Unedited rough draft trans. of Sel'skokhozyaistvennoe Proizvodstvo Sibiri i Dal'nego Vostoka (USSR) 1964, no. 5, p. 3-6.

Descriptors: (*Agriculture, USSR), (*Fertilizers, Distribution), Transportation, Storage, Preparation, Mineral products, Herbicides, Machines, Aircraft.

The functions of a proposed Soviet agrochemical station are described. Model diagrams are presented showing the organization of the station as well as the processes involved in the preparation, storage, and delivery of mineral fertilizers and chemical weed killers.

AD-611 078 Div. 32, 30
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
SPAN: A SYSTEM FOR URBAN DATA MANAGEMENT.
SP series,
by Vladimir V. Almendinger. 11 Nov 64, 25p
SP-1862
Unclassified report

Text of a talk given at the Second Annual Conference on Urban Planning Information Systems and Programs, University of Pittsburgh, September 24-26, 1964.

Descriptors: (*Management planning, Urban areas), (*Urban areas, Management planning), (*Statistical data, Urban areas), (*Information retrieval, Urban areas), Statistical analysis, Computers, Programming (Computers), Social sciences.

This report describes SPAN (Statistical Processing and Analysis) system as a large-scale management, file processing, and statistical analysis system, programmed for the IBM 7090/7094. Reports that its development was initiated at the Penn-Jersey Transportation Study to support a comprehensive simulation model of regional growth. Reviews some of the aspects of Penn-Jersey's experience leading to the development of the SPAN concept, and reports that SDC is expanding this system to make it available to the larger community of urban data users. Reports that two initial volumes of the SPAN system reference manual (TM-1563, TM-1563/013/00), have been published. (Author)

AD-611 079 Div. 32, 30
CFSTI Prices: HC$1.00 MF$0.50

System Development Corp., Santa Monica, Calif.
MANAGEMENT COMMUNICATION ACROSS SPACE AND TIME.
Professional paper,
by Louise Schultz. 15 Nov 64, 12p SP-1860
Unclassified report

Descriptors: (*Management engineering, Information retrieval), (*Information retrieval, Management control systems), (*Subject indexing, Information retrieval), Documentation, Operations research, Multiple operation.

Support to management, beyond that provided by operations control systems, necessary to continuity and consistency in management of long range, large scale projects is afforded in a new indexing technique and machine-oriented retrieval system. (Author)

AD-611 206 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
BOOK REVIEW OF GERTRAUD MENZ, DAS SOWJETISCHE BANKENSYSTEM, BERLIN, 1963,
by Egon Neuberger. Feb 65, 3p
Rept. no. P-3055
TT 65-61750
Unclassified report

Original work pub. as Freie Univ., Berlin, Osteuropa-Institut. Wirtschaftswissenschaftliche Veroffentlichugen (West Germany) 1963, v. 17, 196p.

Descriptors: (*Banking, USSR), (*USSR, Banking), Economics, Reviews, West Germany.

The book consists of four main sections dealing with the history of the development of the Soviet banking system, its present organization, its influence in the micro-economic field, and its influence in the macro-economic field.

AD-611 306 Div. 32
CFSTI Prices: HC$2.00 MF$0.50

RAND Corp., Santa Monica, Calif.
PREPOSITIONAL PHRASES AND AUTOMATIC PARSING.
Memo rept.,
by Kenneth E. Harper. Feb 65, 32p
Rept. no. RM-4383-PR
Contract AF49 638 700

Unclassified report

Descriptors: (*Language, Analysis), Automatic, Machine translation, Information retrieval.

A concordance was prepared for machine-processed Russian text, showing the syntactic governors of prepositional phrases when the word preceding the preposition was a noun (P-1=N). The concordance showed that under this condition, Russian prepositions strongly tend to serve either an adnominal function or an adverbial function. These properties are not inherent in the individual prepositions, but are environmentally determined. The resultant grouping of prepositions is presented as information that can be used in a program for sentence-structure determination. (Author)

AD-611 438 Div. 32, 18
CFSTI Prices: HC$6.00 MF$1.25

Research Triangle Inst., Durham, N. C.
A THESAURUS OF CIVIL DEFENSE DESCRIPTORS.
CIVIL DEFENSE INFORMATION SYSTEMS ANALYSIS.
Final rept., App. E, vol. 2, 1 Dec 63-15 Jan 65,
by W. T. Herzog and J. E. Jenkins. Jan 65, 224p
RTI no. OU-158-1 Unclassified report
Contract OCD PS64 56, Task 4631B

Descriptors: (*Information retrieval, Civil defense systems), (*Subject indexing, Civil defense systems), (*Civil defense systems, Documentation), Indexes, Vocabulary, Classification, Instruction manuals, Language, Libraries, Records, Reports, Analysis.

A listing of approximately 600 words or phrases (descriptors) is provided for use in indexing and retrieving civil defense research information. Inclusion notes, 'Use,' and 'Also see' references are provided as well as general directions for applying descriptors to civil defense information. The descriptor selection was modeled on the system of the Defense Documentation Center (DDC). About 70 of the 600 descriptors are not used by DDC. They were chosen from the Civil Defense Matrix and from special fields of interest. This core of 600 general descriptors can be supplemented with specific terms in the subject areas where the quantity of documents warrants more intensive indexing. From previous library experience (PB-166 415), it is estimated that the 600 descriptors chosen are the minimum number needed for a collection of 1000 documents. (Author)

AD-611 464 Div. 32, 30

Rutgers Univ., New Brunswick, N. J. Graduate School of Library Service.
AUTOMATIC BOOK INDEXING BY COMPUTER.
Doctoral thesis,
by Susan Artandi. 1964, 9p
Grants AF AFOSR62 9, AF AFOSR531 64
AFOSR 65-0290

Unclassified report

Pub. in American Documentation (U.S.) v15 n4 p250-57 Oct 1964 (Copies not available to DDC or Clearinghouse customers).

Descriptors: (*Indexes, Computers), (*Subject indexing, Computers), Automatic, Textbooks, Language, Documentation, Dictionaries, Programming (Computers), Information retrieval.

This paper describes the development and evaluation of an automatic method of deriving suitable index entries from natural language text. A section of a chemistry textbook was selected as the experimental document. Both qualitative and quantitative measures were developed to evaluate quality of indexing. Evaluation of the experimental index was based on these measures and on a comparison with the average published manually produced index found in the same type of material. (Author)

33. Transportation

AD-611 084 Div. 33
CFSTI Prices: HC$6.00 MF$1.50

Arcon Corp., Lexington, Mass.
ANALYSIS OF ORGANIZED ROUTE SYSTEMS IN THE NORTH ATLANTIC.
Final rept.
Sep 64, 251p
Contract FA WA4620, Proj. 116 33
FAA RD-64-142

Unclassified report

Descriptors: (*Air traffic control systems, Atlantic Ocean), (*Systems engineering, Air traffic control systems), Air traffic, Mathematical analysis, Economics, Control simulators, Operation, Air transportation.

This report presents the results of a detailed examination of operational and economic consequences of adopting organized route procedures in the North Atlantic Air Traffic Control System. It is a natural extension of a previous study, System Analysis of the North Atlantic Air Traffic Complex, ARCON Corporation, R 62-3, Contract No. FAA/BRD-334, December 1962 (AD-294 610). Particular emphasis is placed on the aircraft users' requirements and their use as basic criteria in the determination of the economic implications of organized route systems. Also presented is a technique for the formulation of traffic forecasts and a discussion of their significance to the system designer. Several proposed changes and improvements in the present organized route system are analyzed in terms of their operational and economic significance. Detailed mathematical treatments and descriptions of digital computer simulations used in the evaluation of system performance are given in the Appendices. These are: A. Analysis of Organized Route Geometry, B. Air Traffic Control Model, and C. Flight Time Penalty Evaluation. (Author)

AD-611 096 Div. 33
CFSTI Prices: HC$2.00 MF$0.50

Coordinated Science Lab., Univ. of Illinois, Urbana.
AUTOMATIC AIR TRAFFIC CONTROL. PART I. A PROJECTED SYSTEM,
by L. S. Kypta. Nov 62, 44p Rept. no. R-145-A
Contract DA36 039SC85122, Task 3 99 01 002
AD 286 887 superseded

Unclassified report

Descriptors: (*Air traffic control systems, Automatic), (*Decision making, Air traffic control systems), Air traffic controllers, Digital computers, Voice communication systems, Display systems, Data storage systems, Approach, Aviation safety, Flight paths, Tracking, Data processing systems.

The automatic air traffic control system described in the report consists of automatic control centers for en route control and small satellite computers for approach-departure control. Each automatic control center is composed of 5 automatic sections providing the following functions: (1) position gathering and tracking, (2) internal communication, (3) manual input and display, (4) control, and (5) information storage. An automatic center is capable of controlling over 1000 aircraft simultaneously. Each satellite computer is intended to control approaching and departing aircraft for one airport and is capable of controlling 50 flights simultaneously. The goal in the design of the system is to provide a system that in no way hinders traffic flow and also is safe and simple to use. To achieve this goal, it is necessary to automate all processes in which information flows in large quantities or is rapidly changing. The most important process falling in this category is decision making; consequently, decision making has been automated. All processes in which information is slowly changing or infrequently exchanged are to executed manually. (Author)

AD-611 369 Div. 33, 24
CFSTI Prices: HC$3.00 MF$0.75

Aero Service Corp., Philadelphia, Pa.
PHOTOGRAPHY OF FLEXIBLE AIRFIELD PAVEMENTS BY MEANS OF THE SUR/FAX METHOD OF STRIP PHOTOGRAPHY.
Final rept.
30 Oct 64, 58p
Contract NBy53140

Unclassified report

Available copy will not permit fully legible reproduction. Reproduction will be made if requested by users of DDC.
A copy is available for public sale.

Descriptors: (*Runways, Photography), Landing fields, Pavements, Concrete, Bituminous coatings, Photographs, Continuous-strip cameras, Photographic film, Photointerpretability, Navigational aids, Flexible structures, Surfaces, Fracture (Mechanics), Vehicles.

The Sur/Fax system was adapted to airfield runway photography. A map was made showing all of the planimetric surface defects. Although the size of the cracks detected depends somewhat on the contrast between the crack and the surrounding pavement, cracks of one-eighth of an inch or larger can be detected under practically all conditions. It was established that the line-of-light gives qualitative data concerning the rutting across the direction of travel of the vehicle. Where the pavement is extremely smooth, ruts of one quarter of an inch deep in eight feet can be detected. Where the pavement is rough, the line-of-light is less sharp, making it harder to measure the deviation from the straight line. This sharpness or lack of it provides an indication of the condition of the pavement surface.

How To Use Indexes To TAB Portion Of

U. S. GOVERNMENT RESEARCH AND DEVELOPMENT REPORTS

CORPORATE AUTHOR-MONITORING AGENCY INDEX

The Corporate Author-Monitoring Agency Index is arranged alphabetically by corporate authors and monitoring agencies.

In the corporate author entry (designated by an asterisk) for each document are listed the originator of the report, the originator's report number, the title, AD number, and division number. If the source has listed a monitoring agency in the report, the monitor acronym and monitor series number are given in parantheses directly under the title. An IDEP (Interservice Data Exchange Program) report number is presented in the same way. A typical corporate author entry is shown below.

*SHEFFIELD UNIV (ENGLAND)
* * *
HIC 45
INTENTIONAL COMBUSTION OSCILLATIONS IN PROPULSION SYSTEMS.
(AFOSR 64 2029)
AD-608 206 DIV. 25

The three asterisks serve as a separator between entries for reports under the same corporate author.

When a report lists a monitoring agency, a corresponding entry is provided under the name of the monitoring agency, which appears in alphabetical order among the corporate author entries. In a monitoring agency entry, the report number is given above the title in place of the originator's report number. A typical monitoring agency entry is shown below.

*AIR FORCE OFFICE OF SCIENTIFIC RESEARCH WASHINGTON D C
* * *
64 2029
INTENTIONAL COMBUSTION OSCILLATIONS IN PROPULSION SYSTEMS.
AD-608 206 DIV. 25

SUBJECT INDEX

The Subject Index is arranged alphabetically by asterisked descriptors from the document announcements in the TAB. Each announcement contains one or more asterisked descriptors which identify the main subjects of the report. The asterisked descriptor may or may not have a modifying descriptor appearing directly below the asterisked descriptor. Under each descriptor entry in the Subject Index appear the following items of information: annotation, AD number, and division number. A typical subject index entry is shown on the next page.

*COMBUSTION
OSCILLATION
INTENTIONAL COMBUSTION
OSCILLATIONS IN PROPULSION
SYSTEMS
AD-608 206 DIV. 25

PERSONAL AUTHOR INDEX

The Personal Author Index is arranged alphabetically by the last names of the authors of reports. When several report entries are given for one author, the entries are arranged numerically by AD number. Division numbers and titles are also listed. Again, three asterisks serve as a separator between entries for reports under the same author. A typical personal author entry isshown below.

*BENDAT, JULIUS S.
* * *
ZERO CROSSINGS OF A SINE
WAVE PLUS RANDOM NOISE
AD-608 019 DIV. 15
* * *
SPECTRA AND AUTOCORRELATION
FUNCTIONS FOR FULLY DEVELOPED
SEAS AND PREDICTION OF STRUCTURAL
FATIGUE DAMAGE
AD-608 464 DIV. 2

CONTRACT INDEX

The Contract index is arranged alphanumerically by contract number. Within a contract grouping, each entry contains corporate author, series number (if any), monitor number (if any), AD number, and division number.

When there are multiple document entries under one contract number, entries are arranged by AD number under each corporate author represented.

A contract entry may also contain a letter F, A, or S on the left-hand margin, indicating that the document is a Final, Annual, or Summary report. A typical contract entry is shown below.

*AF19 628 500
LINCOLN LAB MASS INST OF TECH
LEXINGTON
LL TR 365
(ESD TDR64 378)
AD-608 272 DIV. 30
LL 1964 63
(ESD TDR64 566)
AD-608 288 DIV. 8

AD-DIVISION INDEX

The AD-Division Index is arranged numerically by AD number and lists the subject division where the full entry can be located in TAB.

SUBJECT INDEX

•ABSORPTION SPECTRUM
CARBON COMPOUNDS
REPRINT: ABSORPTION COEFFICIENTS OF CARBON MONOXIDE IN THE 1006-600-A WAVELENGTH REGION.
AD-611 341 DIV. 25

SILICON
CRITICAL POINTS OF THE FREQUENCY SURFACES IN THE SILICON CRYSTAL.
AD-611 144 DIV. 25
SINGLE PHONON ABSORPTION BANDS IN FAST NEUTRON IRRADIATED SILICON.
AD-611 145 DIV. 25
STUDY OF THE OPTICAL PROPERTIES OF HIGHLY DOPED AND DEGENERATE SILICON.
AD-611 146 DIV. 25
SPECTROSCOPY OF POINT DEFECTS IN SILICON.
AD-611 194 DIV. 25
LOCALIZED VIBRATIONS DUE TO BORON AND LITHIUM IN THE SILICON LATTICE.
AD-611 195 DIV. 25

•ABSORPTION (BIOLOGICAL SKIN)
WATER VAPOR
ON THE TRANSFER FUNCTION OF HUMAN SKIN.
AD-611 281 DIV. 16

•ABSORPTION (BIOLOGICAL)
STOMACH
TRANSLATION OF RUSSIAN RESEARCH: ABSORPTION IN THE STOMACH.
AD-610 973 DIV. 16

•ACCELEROMETERS
CALIBRATION
TRANSLATION OF RUSSIAN PATENT: METHOD OF CALIBRATING ACCELERATION SENSING ELEMENTS WORKING IN PULSED CONDITION.
AD-611 074 DIV. 30

•ACETATES
PYROLYSIS
REPRINT: PYROLYSIS OF ALLYLIC ACETATES.
AD-611 389 DIV. 4

•ACETYL PLASTICS
CRYSTAL SUBSTRUCTURE
STRUCTURE OF DRAWN POLYMERS.
AD-611 069 DIV. 14

•ACOUSTIC IMPEDANCE
MEASUREMENT
REPORT OF NRL PROGRESS.
AD-611 149 DIV. 30

•ACOUSTIC RANGES
UNDERWATER TRACKING
THE ST. CROIX THREE-DIMENSIONAL UNDERWATER TRACKING RANGE.
AD-611 070 DIV. 6

•ACOUSTICS
PROPAGATION
TRANSLATION OF CHINESE RESEARCH: ANTI-WAVEGUIDE PROPAGATION IN A HETEROGENEOUS LAYER.
AD-611 035 DIV. 25

•ADAPTIVE CONTROL SYSTEMS
DYNAMIC PROGRAMMING
MATHEMATICAL APPROACH TO A TYPE OF GENERAL PROBLEM ARISING IN THE STUDY OF CONTROL PROCESSES.
AD-611 305 DIV. 15

•ADJUSTMENT (PSYCHOLOGY)
TEST CONSTRUCTION (PSYCHOLOGY)
REPRESSION-SENSITIZATION SCALE: II. CONCURRENT AND CONSTRUCT VALIDITY.
AD-611 192 DIV. 28

•ADMITTANCE
WAVEGUIDE SLOTS
SELF AND MUTUAL ADMITTANCES OF WAVEGUIDES RADIATING INTO PLASMA LAYERS.
AD-611 202 DIV. 8

•ADRENOCORTICOTROPIC HORMONES
SECRETION
HYPOTHALAMIC SECRETORY FACTOR FOR ADRENOCORTICOTROPIC HORMONE (SF-ACTH).
AD-611 179 DIV. 16

•AERIAL PHOTOGRAPHS
PHOTOGRAMMETRY
TRANSLATION OF RUSSIAN RESEARCH: EFFECT OF ENLARGEMENT OF A PHOTOGRAPHIC IMAGE ON SOME MEASURING PROPERTIES OF AERIAL PHOTOGRAPHS.
AD-611 333 DIV. 24

•AERIAL WARFARE
PERFORMANCE (HUMAN)
TRANSLATION OF A RUSSIAN ARTICLE: REVOLUTION IN MILITARY SCIENCE, ITS IMPORTANCE AND AFTEREFFECTS ON MAN, ALTITUDE AND SPEED.
AD-611 012 DIV. 18

•AERODYNAMIC CHARACTERISTICS
NOISE
SURVEY OF AERODYNAMIC NOISE, EMPHASIZING JET AND BOUNDARY LAYER NOISE.
AD-611 173 DIV. 9

•AERODYNAMIC CONFIGURATIONS
HYPERSONIC FLOW
INVESTIGATION OF HYPERSONIC FLOW SEPARATION AND CONTROL CHARACTERISTICS.
AD-611 272 DIV. 9

•AERODYNAMIC CONTROL SURFACES
EFFECTIVENESS
INVESTIGATION OF HYPERSONIC FLOW SEPARATION AND CONTROL CHARACTERISTICS.
AD-611 272 DIV. 9

•AEROSOLS
VISUAL INSPECTION
TRANSLATION OF RUSSIAN RESEARCH: THE FLOW METHOD OF ULTRAMICROSCOPE MEASUREMENT OF THE PARTICLE CONCENTRATION OF AEROSOLS AND OTHER DISPERSION SYSTEMS.
AD-610 888 DIV. 4

•AEROSPACE CRAFT
MATERIALS
AEROSPACE STRUCTURAL METALS HANDBOOK. VOLUME I. FERROUS ALLOYS.
AD-611 196 DIV. 17

•AGRICULTURE
USSR
TRANSLATION OF RUSSIAN RESEARCH: AGROCHEMICAL STATION FOR PREPARATION, STORAGE, AND DELIVERY OF FERTILIZERS.
AD-611 054 DIV. 32

•AIR DEFENSE COMMAND
MAINTENANCE PERSONNEL
DEVELOPMENT OF A FAULT ISOLATION/CORRECTION TEXT AND TROUBLESHOOTING DIAGRAMS FOR THE AN/FST-28 SAGE COORDINATE DATA PROCESSOR.
AD-611 170 DIV. 18

•AIR FORCE
GUIDED MISSILE RANGES
SYMPOSIUM: DATA REDUCTION AND INSTRUMENTATION ANALYSIS METHODS IN USE AT THE ATLANTIC MISSILE RANGE.
AD-610 855 DIV. 12

•AIR FORCE OPERATIONS
MAINTENANCE
ORGANIZATIONAL MAINTENANCE IN THE SOVIET AIR FORCE.
AD-611 223 DIV. 18

•AIR FORCE SYSTEMS COMMAND
SYSTEMS ENGINEERING
MULTI-PROGRAM ORGANIZATIONS.
AD-611 275 DIV. 30

•AIR FORCE TRAINING
SOCIAL SCIENCES
TRAINING FOR CULTURE-CONTACT AND INTERACTION SKILLS.
AD-611 022 DIV. 29

•AIR MASS ANALYSIS
ARCTIC REGIONS
TRANSLATION OF RUSSIAN RESEARCH: ATMOSPHERIC PROCESSES IN THE CENTRAL ARCTIC.
AD-610 966 DIV. 2

MICROMETEOROLOGY
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AD-611 312 DIV. 2
MESOSCALE CIRCULATIONS OF THE ATMOSPHERIC BOUNDARY LAYER. PART II.
AD-611 313 DIV. 2

•AIR TRAFFIC CONTROL SYSTEMS
ATLANTIC OCEAN
ANALYSIS OF ORGANIZED ROUTE SYSTEMS IN THE NORTH ATLANTIC.
AD-611 084 DIV. 33

AUTOMATIC
AUTOMATIC AIR TRAFFIC CONTROL. PART I. A PROJECTED SYSTEM.
AD-611 096 DIV. 33

MAGNETIC RECORDING SYSTEMS
STUDY ON THE COST-BENEFITS OF RECORDING ON VOICE CHANNELS.
AD-610 993 DIV. 5

•AIR TRANSPORTATION
SIMULATION
A MODEL FOR EVALUATING FLEETS OF TRANSPORT AIRCRAFT.
AD-610 836 DIV. 18

•AIRBURST
NUCLEAR EXPLOSIONS
AIR-BLAST PHENOMENA IN THE HIGH-PRESSURE REGION.
AD-611 257 DIV. 22

•AIRCRAFT
BUFFETING
TRANSLATION OF RUSSIAN RESEARCH: PROBABILITY OF AIRCRAFT BUMPINESS AT VARIOUS WIND VELOCITIES.
AD-611 014 DIV. 1

•AIRCRAFT EQUIPMENT
REPLACEMENT THEORY
PLANNED REPLACEMENT OF AIRCRAFT PARTS.
AD-610 830 DIV. 1

•AIRCRAFT FIRE CONTROL SYSTEMS
COSTS
COST ESTIMATING FOR AIRBORNE ELECTRONIC EQUIPMENT.
AD-611 274 DIV. 22

•AIRFOILS
AERODYNAMIC CHARACTERISTICS
PREDICTION OF THE AERODYNAMIC CHARACTERISTICS OF ANNULAR AIRFOILS.
AD-611 018 DIV. 9

•AIRFRAMES
OPTIMIZATION
DEVELOPMENT OF A PROCEDURE FOR AUTOMATED SYNTHESIS OF MINIMUM WEIGHT STRUCTURES.
AD-611 310 DIV. 1

•ALGAE
PHOTOSYNTHESIS
REGULATION OF PHOTOSYNTHETIC ACTIVITY IN CHLAMYDOMONAS REINHARDI.
AD-610 863 DIV. 16

•ALGEBRA
NUMBER THEORY
RESEARCH ON ALGEBRAIC NUMBER THEORY.
AD-611 331 DIV. 15

•ALKALI METALS
OXIDATION-REDUCTION REACTIONS
REPRINT: MOLECULAR ORBITAL TREATMENT OF THE REDUCTION OF FLUORANTHENE WITH ALKALI METALS.
AD-611 289 DIV. 4

PLASMA MEDIUM
RADIATION FROM A GAS CONTAINING ALKALI METAL VAPORS.
AD-611 127 DIV. 25

•ALKALINE CELLS
STORAGE BATTERIES
INVESTIGATION OF HERMETICALLY SEALED MAINTENANCE-FREE, HIGH RATE, NICKEL-CADMIUM BATTERIES FOR AIRCRAFT APPLICATIONS.
AD-611 404 DIV. 1

•ALLOYS
CRYOGENICS
CRYOGENIC MATERIALS DATA HANDBOOK.
AD-611 165 DIV. 25

HANDBOOKS
AEROSPACE STRUCTURAL METALS HANDBOOK. VOLUME 1. FERROUS ALLOYS.
AD-611 196 DIV. 17

•ALL-WEATHER AVIATION
INSTRUMENT LANDINGS
EXPERIMENTATION WITH FLARESCAN VERTICAL GUIDANCE LANDING SYSTEM.
AD-611 445 DIV. 19
EXPERIMENTATION WITH PEGAL (RANGE AND ELEVATION GUIDANCE FOR APPROACH AND LANDING) VERTICAL GUIDANCE LANDING SYSTEM.
AD-611 446 DIV. 19

•ALPHA PARTICLE DETECTORS
RADIOACTIVE FALLOUT
SURFACE ALPHA MONITORING AS A METHOD OF MEASURING PLUTONIUM FALLOUT.
AD-611 240 DIV. 20

•ALPHA PARTICLES
DOSAGE
DOSIMETRIC EVALUATION OF THE ALPHA FLUX IN SOLAR PARTICLE BEAMS.
AD-611 323 DIV. 16

•ALTIMETERS
FLIGHT TESTING
TEST OF TRAIL CONE SYSTEM TO CALIBRATE STATIC PORTS FOR BAROMETRIC ALTIMETERS.
AD-611 444 DIV. 1

•ALUMINUM
X-RAY SPECTRUM
EFFECT OF CHEMICAL COMBINATION ON K X-RAY EMISSION SPECTRA FROM MAGNESIUM, ALUMINUM AND SILICON.
AD-611 102 DIV. 25

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(AFCRL 65-19)
AD-611 309 DIV. 8

•AF19 628 500
LINCOLN LAB MASS INST OF TECH LEXINGTON
TR 367
(ESD TDR-64-588)
AD-611 436 DIV. 8

•AF19 628 559
MATRIX CORP ARLINGTON VA
(ESD TDR-64-664)
F AD-611 170 DIV. 18

•AF30 602 2907
SAINT LOUIS UNIV MO
(RADC TDR-64-455)
A AD-611 184 DIV. 20

•AF30 602 2997
GENERAL TELEPHONE AND ELECTRONICS LABS INC BAYSIDE N Y
(RADC TDR-64-276)
F AD-611 166 DIV. 25

•AF30 602 3049
CLARKSON COLL OF TECH POTSDAM N Y
(RADC TDR-64-458)
F AD-611 161 DIV. 8

•AF30 602 3102
SPERRY GYROSCOPE CO GREAT NECK N Y RADIATION DIV
EB 9296 0542
(RADC TDR-64-497)
F AD-611 270 DIV. 8

•AF30 602 3183
MARTIN MARIETTA CORP ORLANDO FLA
OR 6228
(RADC TDR-64-504)
F AD-611 068 DIV. 8

•AF30 602 3278
MICROWAVE ASSOCIATES INC BURLINGTON MASS
(RADC TR-64-518)
AD-611 285 DIV. 8

•AF30 602 3419
GENERAL ELECTRIC CO KING OF PRUSSIA PA SPACECRAFT DEPT
(RADC TDR-64-481)
AD-610 943 DIV. 8

•AF30 602 3490
NEW YORK UNIV N Y
(RADC TDR64 558)
AD-610 866 DIV. 8

•AF33 615 1121
DEFENSE METALS INFORMATION CENTER COLUMBUS OHIO
DMIC 211
AD-611 021 DIV. 26

•AF33 615 1239
ELECTRONIC PROPERTIES INFORMATION CENTER CULVER CITY CALIF
DS 143
AD-610 828 DIV. 25

•AF33 615 1333
TECHNICAL OPERATIONS RESEARCH BURLINGTON MASS
(HL TR65-14)
F AD-610 864 DIV. 30

•AF33 615 1341
NORAIR DIV NORTHROP CORP HAWTHORNE CALIF
NOR 65 28
AD-610 852 DIV. 26

•AF33 615 1901
SPERRY ELECTRONIC TUBE DIV SPERRY RAND CORP GAINESVILLE FLA
NJ 2761 0173 3
AD-611 902 DIV. 8

•AF33 615 1967
KORAD CORP SANTA MONICA CALIF
AD-611 916 DIV. 8

•AF33 615 2009
LABORATORIES FOR RESEARCH AND DEVELOPMENT FRANKLIN

INST PHILADELPHIA PA
Q 82289 1
AD-611 418 DIV. 26

•AF33 615 2087
GULTON INDUSTRIES INC METUCHEN N J
AD-611 404 DIV. 1

•AF33 616 7792
SYRACUSE UNIV N Y RESEARCH INST
AD-611 196 DIV. 17

•AF33 616 7838
DAYTON UNIV OHIO RESEARCH INST
(ML TDR64 62 V2)
AD-610 867 DIV. 14

•AF33 616 8130
GRUMMAN AIRCRAFT ENGINEERING CORP BETHPAGE N Y
(FDL TR-64-174)
AD-611 272 DIV. 9

•AF33 616 8264
GENERAL ELECTRIC RESEARCH LAB SCHENECTADY N Y
AD-611 168 DIV. 25

•AF33 657 10945
GENERAL TECHNOLOGY CORP ELGIN ILL
(FDL TDR-64-132)
AD-611 173 DIV. 9
TR 4 2
(FDL TDR-64-133)
AD-611 174 DIV. 25
TR 4 3
(FDL TDR-64-131)
AD-611 271 DIV. 25

•AF33 657 11070
RESEARCH TRIANGLE INST DURHAM N C
(ML TR-64-351)
AD-611 069 DIV. 14

•AF33 657 11282
PERKIN-ELMER CORP NORWALK CONN
(ML TR-64-362)
AD-611 430 DIV. 25

•AF33 657 11475
THOMAS (A S) INC BOSTON MASS
M 63 1
AD-611 336 DIV. 25

•AF33 657 11982
TEXAS INSTRUMENTS INC DALLAS
TI 03 65 10
AD-610 871 DIV. 8

•AF33 657 11748
BELL AEROSYSTEMS CO BUFFALO N Y
(FDL TDR-64-141)
AD-611 310 DIV. 1

•AF33 657 63 398
FOREST PRODUCTS LAB MADISON WIS
FPL-086
AD-611 103 DIV. 14

•AF33 657 7271
YALE UNIV NEW HAVEN CONN OBSERVATORY
(ARL 64-202)
F AD-610 946 DIV. 25

•AF33 657 8666
MECHANICAL TECHNOLOGY INC LATHAM N Y
(FDL TDR-64-12)
AD-611 171 DIV. 12

•AF33 657 8925
GENERAL DYNAMICS ASTRONAUTICS SAN DIEGO CALIF
GDA63 1214
(ML TDR-64-94 PT 1)
S AD-611 172 DIV. 22

•AF33 657 9161
MARTIN MARIETTA CORP DENVER COLO
AD-611 165 DIV. 25

•AF41 609 1693
USAF RADIATION LAB UNIV OF CHICAGO ILL
AD-610 947 DIV. 16

•AF49 638 1027
PENNSYLVANIA UNIV PHILADELPHIA SCHOOL OF METALLURGICAL ENGINEERING
(AFOSR 23861)
AD-611 197 DIV. 17

•AF49 638 1029
WESTINGHOUSE RESEARCH LABS PITTSBURGH PA
62 925 116 P2
(AFOSR 2353)
AD-611 199 DIV. 25

•AF49 638 109
CALIFORNIA UNIV BERKELEY
(AFOSR 65-0214)
AD-611 289 DIV. 4
(AFOSR 65-0213)
AD-611 290 DIV. 4
(AFOSR 65-0222)
AD-611 343 DIV. 4
(AFOSR 65-0215)
AD-611 348 DIV. 4
(AFOSR 65-0216)
AD-611 349 DIV. 4
(AFOSR 65-0217)
AD-611 350 DIV. 4
(AFOSR 65 0218)
AD-611 351 DIV. 4
(AFOSR 65 0219)
AD-611 352 DIV. 4
(AFOSR 65-0220)
AD-611 353 DIV. 4

•AF49 638 109 GRANT
CALIFORNIA UNIV BERKELEY
(AFOSR 65-0223)
AD-611 455 DIV. 4

•AF49 638 1094
DELAWARE UNIV NEWARK
(AFOSR 2105)
AD-611 381 DIV. 25

•AF49 638 1094
IIT RESEARCH INST CHICAGO ILL
AD-611 111 DIV. 10
AD-611 112 DIV. 10

•AF49 638 1185
GENERAL DYNAMICS ELECTRONICS ROCHESTER N Y
(AFOSR 65-0294)
AD-611 462 DIV. 16

•AF49 638 1203
GRAFIX INC ALBUQUERQUE N MEX
(AFOSR 65-0275 P1)
F AD-611 334 DIV. 30
(AFOSR 65-0275 P2)
F AD-611 335 DIV. 30

•AF49 638 1242
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS UNIV OF MARYLAND COLLEGE
BN 389
AD-610 842 DIV. 19

•AF49 638 1280
STANFORD UNIV CALIF
(AFOSR 65-0029)
AD-611 345 DIV. 9
(AFOSR 65-0277)
AD-611 347 DIV. 9

•AF49 638 1326
BROWN UNIV PROVIDENCE R I
(AFOSR 65-0278)
AD-611 456 DIV. 9

•AF49 638 1327
BEGE (J R M) CO ARLINGTON MASS
6454
(AFOSR 64-2517)
F AD-611 429 DIV. 25

•AF49 638 208
RICE UNIV HOUSTON TEX
(AFOSR 2260)
AD-611 385 DIV. 19

•AF49 638 247
MCMASTER UNIV HAMILTON (ONTARIO)
(AFOSR 2241)
F AD-611 239 DIV. 20

•AF49 638 292
TUFTS UNIV MEDFORD MASS
(AFOSR 2120)
AD-611 389 DIV. 4

•AF49 638 333
NORTH CAROLINA UNIV CHAPEL HILL
(AFOSR 1547)
AD-611 203 DIV. 4

•AF49 638 439
PENNSYLVANIA UNIV PHILADELPHIA
(AFOSR 2322)
AD-611 384 DIV. 25

•AF49 638 439
MICHIGAN UNIV ANN ARBOR COLL OF LITERATURE SCIENCE AND THE ARTS
02822 4 F
(AFOSR 1803)
F AD-611 134 DIV. 25

•AF49 638 448
POLYTECHNIC INST OF BROOKLYN N Y
(AFOSR 24191)
AD-611 191 DIV. 9

•AF49 638 460
TEXAS UNIV AUSTIN
(AFOSR 146)
AD-611 192 DIV. 28
(AFOSR 145)
AD-611 358 DIV. 28

•AF49 638 464
WASHINGTON UNIV ST LOUIS MO
TR 35
(AFOSR TN-60-1230)
AD-611 390 DIV. 4
TR 38
(AFOSR TN-617)
AD-611 391 DIV. 4

•AF49 638 468
JOHNS HOPKINS UNIV BALTIMORE MD
(AFOSR 2266)
AD-611 193 DIV. 4

•AF49 638 473
OREGON UNIV EUGENE
(AFOSR 221)
AD-611 386 DIV. 4

•AF49 638 478
CATHOLIC UNIV OF AMERICA WASHINGTON D C
(AFOSR 65-0233)
AD-611 346 DIV. 4
(AFOSR 65-0234)
AD-611 460 DIV. 4
(AFOSR 65-0232)
AD-611 461 DIV. 4

•AF49 638 492

COMMUNICATION SCIENCES LAB
UNIV OF MICHIGAN ANN ARBOR
(AFOSR 2099)
AD-611 293 DIV. 5

•AF49 638 90 GRANT
RENSSELAER POLYTECHNIC INST
TROY N Y
(AFOSR 69-0294)
F AD-611 169 DIV. 4

•AF49 638 931
PURDUE UNIV LAFAYETTE IND
(AFOSR 2038)
AD-611 387 DIV. 4

•AF49 638 931 GRANT
PURDUE UNIV LAFAYETTE IND
(AFOSR 2039)
AD-611 388 DIV. 4

•AF49 638 939
JOHNS HOPKINS UNIV BALTIMORE
MD
(AFOSR 2305)
F AD-611 157 DIV. 4

•AF49 638 944
CORNELL UNIV ITHACA N Y
GRADUATE SCHOOL OF AERONAUTICAL
ENGINEERING
AD-610 868 DIV. 9

•AF49 638 956
ELECTRICAL ENGINEERING RESEARCH
LAB UNIV OF ILLINOIS URBANA
(AFOSR 2306)
AD-611 355 DIV. 25

•AF49 638 979
ILLINOIS UNIV URBANA
TN 6
(AFOSR 13921)
AD-611 301 DIV. 25

•AF49 638 987
PRINCETON UNIV N J
(AFOSR 2381)
AD-611 498 DIV. 16

•AF49 638 991
WESTINGHOUSE RESEARCH LABS
PITTSBURGH PA
RR 403FD428 R4
(AFOSR TN-60-573)
AD-611 208 DIV. 7

•AF49 638 640
WESTERN ONTARIO UNIV LONDON
(ONTARIO)
(AFOSR 209)
AD-611 291 DIV. 25

•AF49 638 682
GEORGE WASHINGTON UNIV WASHINGTON
D C
(AFOSR 1801)
AD-611 288 DIV. 28

•AF49 638 700
RAND CORP SANTA MONICA CALIF
RM 4939 PR
AD-610 953 DIV. 25
RM 4382 PR
AD-611 223 DIV. 18
RM 4340 PR
AD-611 304 DIV. 15
RM 4474 PR
AD-611 305 DIV. 15
RM 4461 PR
(TT 65-61755)
AD-611 307 DIV. 20
RM 4383 PR
AD-611 306 DIV. 32

•AF49 638 708
MASSACHUSETTS INST OF TECH
CAMBRIDGE
(AFOSR 2971)
AD-611 294 DIV. 9

•AF49 638 709
PRINCETON UNIV N J
560
(AFOSR 10281)
F AD-611 132 DIV. 9

•AF49 638 711
MINNESOTA UNIV MINNEAPOLIS
(AFOSR TN60 751)
AD-610 870 DIV. 4

•AF49 638 717
CALIFORNIA UNIV LOS ANGELES
(AFOSR 2488)
AD-611 457 DIV. 20

•AF49 638 722
STERLING CHEMISTRY LAB YALE
UNIV NEW HAVEN CONN
(AFOSR 3890)
AD-611 449 DIV. 4
(AFOSR 1593)
AD-611 450 DIV. 4
(AFOSR 974)
AD-611 451 DIV. 4
(AFOSR 2156)
AD-611 452 DIV. 4

•AF49 638 731 GRANT
IOWA STATE UNIV OF SCIENCE
AND TECH AMES
(AFCRL 1077)
F AD-611 364 DIV. 25

•AF49 638 794 GRANT
CALIFORNIA UNIV SANTA BARBARA
(AFOSR 69-0311)
AD-611 180 DIV. 28

•AF49 638 801
SYRACUSE UNIV N Y DEPT OF
PHYSICS
(AFOSR 177)
AD-611 362 DIV. 20

•AF49 638 829
CALIFORNIA ACADEMY OF SCIENCES
SAN FRANCISCO
(AFOSR 2517)
AD-611 342 DIV. 16

•AF49 638 877
NORTHWESTERN UNIV EVANSTON
ILL
(AFOSR 3249)
AD-610 991 DIV. 15

•AF49 638 952
CORNELL AERONAUTICAL LAB INC
BUFFALO N Y
(AFOSR 604)
AD-611 354 DIV. 9

•AF61 052 107
PISA UNIV (ITALY)
(AFOSR TN-60-1277)
AD-611 370 DIV. 16

•AF61 052 162
ROYAL INST OF TECH STOCKHOLM
(SWEDEN)
TN 11
(AFOSR 196)
AD-611 298 DIV. 4
TN 10
(AFOSR 197)
AD-611 299 DIV. 4
TN 12
(AFOSR 198)
AD-611 300 DIV. 4

•AF61 052 180
OXFORD UNIV (ENGLAND)
(AFOSR 250)
AD-611 292 DIV. 16

•AF61 052 29
MILAN UNIV (ITALY)
(AFOSR TN-59-655)
AD-611 303 DIV. 16

•AF61 052 271
LONDON UNIV (ENGLAND)
(AFOSR 1263)
AD-611 302 DIV. 16

•AF61 052 309
KAROLINSKA INST STOCKHOLM
(SWEDEN)
(AFOSR 2337)
AD-611 297 DIV. 16

•AF61 052 42
AARHUS UNIV (DENMARK)
(AFOSR 232)
AD-611 295 DIV. 15

•AF61 052 500 GRANT
FORSVARETS FORSKNINGSINSTITUTT
KJELLER (NORWAY)
E 43
(AFCRL 65-56)
AD-610 861 DIV. 2

•AF61 052 536
CONSIGLIO NAZIONALE DELLE
RICERCHE FLORENCE (ITALY)
CENTRO DI STUDIO PER LA
(AFCRL 64 1015)
F AD-610 862 DIV. 25

•AF61 052 551
TECHNION -ISRAEL INST OF TECH
HAIFA
(AFCRL 65-89-A1)
F AD-611 368 DIV. 30
(AFCRL 65-891)
F AD-611 371 DIV. 30

•AF61 052 572
ECOLE NORMALE SUPERIEURE
PARIS (FRANCE)
TN 1
(AFOSR 5429)
AD-611 144 DIV. 25
TN 2
(AFOSR 5430)
AD-611 145 DIV. 25
TN 5
(AFOSR 5437)
AD-611 146 DIV. 25
TN 3
(AFOSR 5431)
AD-611 194 DIV. 25
TN 4
(AFOSR 5432)
AD-611 195 DIV. 25

•AF61 052 62
HULL UNIV (ENGLAND)
(AFOSR 2493)
AD-611 357 DIV. 10

•AF61 052 769
BRUSSELS UNIV (BELGIUM)
(WADD TR-60-782 P25)
AD-611 365 DIV. 4

•AT29 2 746
COAST AND GEODETIC SURVEY
WASHINGTON D C
(WT 1741)
F AD-611 242 DIV. 25

•AT49 7 2430
NAVAL ORDNANCE LAB WHITE
OAK MD
NOLTR 64 220
AD-611 198 DIV. 20

•CONTRACT
CALIFORNIA UNIV BERKELEY
(AFOSR 65-0222)
AD-611 343 DIV. 4

•DA AMC36 039 63G1
WASHINGTON UNIV SEATTLE
DEPT OF ATMOSPHERIC SCIENCES
AD-611 337 DIV. 2

•DAD1 021AMC1066AZ
AMERICAN OPTICAL CO SOUTHBRIDGE
MASS
AD-610 876 DIV. 14

•DAD9 499AMC376A
ELECTRO-OPTICAL SYSTEMS INC PASADENA CALIF
EOS 4821 FINAL
F AD-611 417 DIV. 25

•DA11 022ORD2649
MINNESOTA UNIV ST PAUL
(AROD 2020 5)
F AD-611 158 DIV. 4

•DA11 022ORD4048A
MAGNAVOX CO URBANA ILL
F AD-611 156 DIV. 12

•DA18 108 40BCHL666
WASHINGTON UNIV SEATTLE
F AD-611 281 DIV. 16

•DA18 108CHL6873
LEVER BROTHERS CO EDGEWATER N J
AD-611 221 DIV. 16

•DA19 129QM1100
STANFORD RESEARCH INST MENLO PARK CALIF
(DSSC S-572)
F AD-611 224 DIV. 29

•DA19 129QM1921
WEST VIRGINIA UNIV MORGANTOWN
(DSSC S-597)
F AD-611 359 DIV. 16

•DA19 129QM1955
WEST VIRGINIA UNIV MORGANTOWN
(DSSC S-597)
F AD-611 359 DIV. 16

•DA23 072AMC48A
SOUTHWEST RESEARCH INST SAN ANTONIO TEX
AD-611 395 DIV. 4

•DA28 043AMC00030E
HONEYWELL INC HOPKINS MINN
AD-611 269 DIV. 7

•DA31 124ARO D109
PRINCETON UNIV N J
CRD AA C 2364 C
AD-611 061 DIV. 4

•DA31 124ARO D139
JOINT INST FOR LABORATORY ASTROPHYSICS BOULDER COLO
AD-610 847 DIV. 2

•DA36 034AMC00061A
AEROPROJECTS INC WEST CHESTER PA
65 13
AD-610 948 DIV. 22

•DA36 034ORD3693RD
INSTITUTE FOR COOPERATIVE RESEARCH UNIV OF PENNSYLVANIA PHILADELPHIA
F AD-611 169 DIV. 8

•DA36 039AMC00878
WISCONSIN UNIV MADISON DEPT OF METEOROLOGY
AD-611 209 DIV. 2

•DA36 039AMC01471E
CLEVITE CORP BEDFORD OHIO
AD-611 413 DIV. 8

•DA36 039AMC01479E
ERIE TECHNOLOGICAL PRODUCTS INC PA
AD-611 219 DIV. 8

•DA36 039AMC02197E
RADIO CORP OF AMERICA LANCASTER PA
AD-611 403 DIV. 25

•DA36 039AMC03617E
WESTINGHOUSE ELECTRIC CORP PHILADELPHIA PA
AD-611 217 DIV. 8

•DA36 039AMC03620E
HAMILTON STANDARD DIV UNITED AIRCRAFT CORP BROAD BROOK CONN
HSER 3053
AD-611 284 DIV. 8

•DA36 039AMC03625E
HAMILTON STANDARD DIV UNITED AIRCRAFT CORP WINDSOR LOCKS CONN
EBR 147
AD-611 141 DIV. 8

•DA36 039AMC03630E
CORNELL-DUBILIER ELECTRONICS DIV FEDERAL PACIFIC ELECTRIC CO NORWOOD MASS
AD-611 218 DIV. 8

•DA36 039AMC03633E
BULOVA WATCH CO WOODSIDE N Y ELECTRONICS DIV
AD-611 131 DIV. 8

•DA36 039SC78968
RCA DEFENSE ELECTRONIC PRODUCTS CAMDEN N J
AD-610 851 DIV. 8
AD-611 399 DIV. 8

•DA36 039SC88122
COORDINATED SCIENCE LAB UNIV OF ILLINOIS URBANA
R 156
AD-611 007 DIV. 30
R 153
AD-611 008 DIV. 8
R 151
AD-611 009 DIV. 8
R 145 A
(AD 286 887 SUPERSEDED)
AD-611 096 DIV. 33
R 160
(N63 13814)
AD-611 097 DIV. 23
R 157
AD-611 098 DIV. 8
R 155
(N63 19775)
AD-611 113 DIV. 15

•DA36 039SC88951
GENERAL ELECTRIC CO BRIDGEPORT CONN
AD-611 143 DIV. 14

•DA44 177TC624
AVIATION SAFETY ENGINEERING AND RESEARCH PHOENIX ARIZ
AVCIR 16 PV 127
(TRECOM TR-60-74)
F AD-610 997 DIV. 1

•DA49 007MD317
HARVARD COLL CAMBRIDGE MASS
PRESIDENT AND FELLOWS
F AD-611 443 DIV. 13

•DA49 146XZ041
GENERAL ATOMIC DIV GENERAL DYNAMICS CORP SAN DIEGO CALIF
GA 5615
(DASA 1573)
A AD-610 869 DIV. 2

•DA83D AMXDO CSA4DA
PURDUE RESEARCH FOUNDATION LAFAYETTE IND
AD-611 189 DIV. 9

•FA WA4620
ARCON CORP LEXINGTON MASS
(FAA RD-64-142)
F AD-611 084 DIV. 33

•GP948
COMPUTER SCIENCE DIV STANFORD UNIV CALIF
CS 17
AD-611 434 DIV. 30

•GRANT AF AFOSR61 4
AARHUS UNIV (DENMARK)
(AFOSR 232)
AD-611 295 DIV. 15

•NASW845
INSTITUTE FOR FLUID DYNAMICS AND APPLIED MATHEMATICS UNIV OF MARYLAND COLLEGE
BN 385
AD-610 842 DIV. 19

•NBY53140
AERO SERVICE CORP PHILADELPHIA PA
F AD-611 369 DIV. 33

•NIH CY4536
PURDUE UNIV LAFAYETTE IND
(AFOSR 2029)
AD-611 388 DIV. 4

•NOBSR87522
ROTRON MFG CO WOODSTOCK N Y
AD-610 995 DIV. 26

•NOBSR87542
WESTON INSTRUMENTS INC NEWARK N J
AD-611 099 DIV. 8

•NOBSR89290
KNIGHTS (JAMES) CO SANDWICH ILL
AD-611 182 DIV. 25

•NOBSR89405
EDGERTON GERMESHAUSEN AND GRIER INC BOSTON MASS
B 2969
F AD-610 848 DIV. 8

•NOBSR91299
GENERAL ELECTRIC CO AUBURN N Y SEMICONDUCTOR PRODUCTS DEPT
AD-611 178 DIV. 8

•NOBSR91341
MICROWAVE ELECTRONICS CORP PALO ALTO CALIF
AD-611 213 DIV. 8

•NOBSV91188
TIMES WIRE AND CABLE CO INC WALLINGFORD CONN
ER 281A
AD-611 136 DIV. 7

•NOBS88342
CORNELL AERONAUTICAL LAB INC BUFFALO N Y
CAL BB 1798 S 1
AD-611 047 DIV. 9

•NOBS88947
OCEANICS INC PLAINVIEW N Y
64 14
AD-611 167 DIV. 9

•NOBS90265
OCEANICS INC PLAINVIEW N Y
64 18A
AD-611 367 DIV. 31

•NOBS90267
AMERICAN OIL CO WHITING IND
AD-611 396 DIV. 14

•NONR G00017 64
MICHIGAN UNIV ANN ARBOR
DEPT OF MATHEMATICS
AD-611 331 DIV. 15

•NONR G00044 64

ACADEMY OF NATURAL SCIENCES
OF PHILADELPHIA PA
F AD-611 933 DIV. 2

•NONR G00056 62
BRITISH COLUMBIA UNIV VANCOUVER
INST OF OCEANOGRAPHY
F AD-611 961 DIV. 2

•NONR-225(37)
STANFORD UNIV CALIF SCHOOL
OF HUMANITIES AND SCIENCES
CS 14
(TT 65-61724)
AD-611 095 DIV. 15

•NONR-22552
STANFORD UNIV CALIF DEPT
OF STATISTICS
TR 102
AD-611 176 DIV. 15

•NONR110024
PURDUE RESEARCH FOUNDATION
LAFAYETTE IND
AD-611 911 DIV. 25

•NONR114115
CASE INST OF TECH CLEVELAND
OHIO
TR 2
AD-611 092 DIV. 17

•NONR122423
MICHIGAN UNIV ANN ARBOR
COLL OF LITERATURE SCIENCE
AND THE ARTS
TR 19
AD-611 133 DIV. 25

•NONR122826
NORTHWESTERN UNIV EVANSTON
ILL
TR 14
AD-611 142 DIV. 30

•NONR140603
ILLINOIS INST OF TECH CHICAGO
AD-610 859 DIV. 26

•NONR150906
IOWA STATE UNIV IOWA CITY
SUI 64 40
AD-611 094 DIV. 2

•NONR150906 GRANT
IOWA STATE UNIV IOWA CITY
65 3
AD-611 927 DIV. 2

•NONR166100 GRANT
PENNSYLVANIA STATE UNIV UNIVERSITY
PARK DEPT OF GEOLOGY AND
GEOPHYSICS
F AD-610 944 DIV. 2

•NONR185809
PRINCETON UNIV N J
AD-610 998 DIV. 25
A AD-610 999 DIV. 25

•NONR186610
HARVARD UNIV CAMBRIDGE MASS
DIV OF ENGINEERING AND APPLIED
PHYSICS
AD-611 147 DIV. 25

•NONR211904
TEXAS A AND M UNIV COLLEGE
STATION DEPT OF OCEANOGRAPHY
AND METEOROLOGY
REF 64 27
AD-611 210 DIV. 2

•NONR219600
WOODS HOLE OCEANOGRAPHIC INSTI
TUTION MASS
64 55
AD-610 849 DIV. 2

•NONR22261
CALIFORNIA UNIV BERKELEY
AD-611 214 DIV. 20

•NONR22283 GRANT
OPERATIONS RESEARCH CENTER
UNIV OF CALIF BERKELEY
ORC 64 17 (RR)
AD-610 950 DIV. 15
ORC 64 28 (RR)
AD-610 951 DIV. 15
ORC 64 27
AD-610 952 DIV. 8

•NONR22537
STANFORD UNIV CALIF SCHOOL
OF HUMANITIES AND SCIENCES
CS 15
AD-611 366 DIV. 15
CS16
AD-611 427 DIV. 15

•NONR22537 GRANT
COMPUTER SCIENCE DIV STANFORD
UNIV CALIF
CS 17
AD-611 934 DIV. 30

•NONR22552
STANFORD UNIV CALIF
AD-610 843 DIV. 28
AD-610 844 DIV. 15
AD-610 845 DIV. 15

•NONR22560
STANFORD UNIV CALIF
TR 4
AD-611 216 DIV. 17

•NONR22578
MICROWAVE LAB STANFORD UNIV
CALIF
ML 1211
AD-611 062 DIV. 25

•NONR23339
CALIFORNIA UNIV LOS ANGELES
F AD-610 878 DIV. 16

•NONR23373
CALIFORNIA UNIV LOS ANGELES
RR 91
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OTHER RESEARCH REPORTS AND RELATED MATERIAL

*Descriptors marked with an asterisk are included in the subject index

1. Aircraft and Flight Equipment

No Entries

2. Astronomy, Geophysics and Geography

NYO-10221 Div. 2, 20
CFSTI Prices: HC$2.00 MF$0.50

Parametrics, Inc., Waltham, Mass.
RADIOLOGICAL MECHANISMS FOR GEOPHYSICAL RESEARCH.
Annual rept.,
by M. Bramson and C. A. Ziegler. 31 Oct 64, 26p
Contract AT(30-1)2983
Unclassified report

Descriptors: (*Geophysics, Nuclear physics).

Patent 3,164,674 Div. 2, 8, 30

METHODS FOR ELECTRONIC TRANSMISSION AND REPRODUCTION OF DATA IN GRAPHIC FORM.
Patent assigned to Air Force,
by Vincent E. Lally and Charles F. Campen, Jr.
5 Jan 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Data transmission systems), (*Data transmission systems, Patents), (*Meteorological parameters, Data transmission systems), Facsimile transmission, Meteorological charts, Reproduction, Data, Mapping, Design, Graphics.

A weather map or other graph is traced by viewing the signal output of the transmitting medium and concurrently manipulating a control device, apart from the map itself, to the proper extent, and in the proper direction, to cause the application to the map of selected indices representative of weather information. Manipulation of the control device is effective for concurrently transmitting the signal output to remote stations.

PB-166 501 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Texas A. and M. Univ., College Station.
PRODUCTIVITY STUDIES ALONG THE ARGENTINE COAST, DRAKE PASSAGE AND WEDDELL SEA, IV.
Semi-annual rept. for 1 Nov 63-30 Apr 64,
by Sayed Z. El-Sayed. 24 Jul 64, 49p
TAMU Ref-64-18a Unclassified report
Grant NSF G21444, Proj. 366

Descriptors: (*Oceanology, Atlantic Ocean), (*Atlantic Ocean, Oceanographic data), (*Marine biology, Atlantic Ocean), Oceans, Southern Hemisphere, Plankton, Physical properties, Chemical properties, Hydrographic surveying, Beaches, Argentina, Data, Tables.

The purpose of this report is to present all the physical, chemical, and biological data obtained during the November, 1963 cruise aboard the ARA/Capitan Canepa (Cruise V) to the Drake Passage and during Cruise VI aboard the Argentine ice-breaker General San Martin to the Weddell Sea which lasted from December 9, 1963 to January 17, 1964. The main objective of these two cruises was to study primary production and standing crop of phytoplankton in the following areas: Argentine continental shelf, Drake Passage and Weddell Sea. (Author)

PB-166 682 Div. 2, 30
CFSTI Prices: HC$2.00 MF$0.50

Chicago Univ., Ill.
PROPOSED OPERATION OF INSTRUMENTED AIRCRAFT FOR RESEARCH ON MOISTURE FRONTS AND WAKE DEPRESSIONS,
by Tetsuya Fujita and Dorothy L. Bradbury.
Dec 64, 37p SMRP-RP-37 Unclassified report
Grant CWB WBG-41

Descriptors: (*Aircraft, Meteorological instruments), (*Meteorological instruments, Airborne), (*Weather forecasting, Instrumentation), Air mass analysis, Meteorological parameters, Meteorological phenomena, Measurement, Doppler systems, Meteorology.

In order to utilize the U. S. Weather Bureau's instrumented airplanes for research on severe local storms over the Midwest, preliminary tests and evaluations on the airborne Doppler systems have been completed. Results indicated that the Doppler data always include some errors which are caused by the system itself, conditions of the backscattering surface, precipitation beneath the aircraft, the aircraft's angle of bank, etc. If these causes are known completely, it is feasible that a majority of the errors can be corrected for use in mesoscale research problems. In order to minimize such causes, the meteorological systems to be flown through in this proposed flight program in 1965 are limited to the dry systems, thus avoiding mature squall lines. Moisture fronts and wake depressions have been selected and a review of our present knowledge on these disturbances and several proposed flight patterns are presented. (Author)

PB-166 754 Div. 2
CFSTI Prices: HC$2.00 MF$0.50

Texas A. and M. Univ., College Station.
TRACE ELEMENTS IN ANTARCTIC GLACIAL MARINE SEDIMENTS.
Annual rept. for 1 Sep 63-1 Nov 64,
by Ernest E. Angino. Dec 64, 28p Reference 64-29A
Grant NSF GA101
Unclassified report

Descriptors: (*Polar regions, Ocean bottom sampling), (*Geochemistry, Ocean bottom sampling), (*Sedimentation, Polar regions), Glaciers, Seas, Silt, Well logging, Chemical analysis.

The main objective of this study is to determine existing differences, if any, in trace element content of Antarctic glacial marine sediments as compared to other types of marine sediments. A second objective is to ascertain if it is possible to use variations in trace element content as a function of depth in the core and sediment type as an indicator of past climatic changes in Antarctic waters and additionally to test whether these data might be suggestive of changes in the climatic regimen of adjacent continental areas.

PB-166 786 Div. 2, 15, 25
CFSTI Prices: HC$1.00 MF$0.50

Rhode Island Univ., Kingston. Div. of Engineering Research and Development.
RAYLEIGH WAVE TRANSMISSION ON ELASTIC WEDGES,
Scientific rept. no. 1,
by Julius Kane and John Spence. Jan 63, 24p
Rept. no. 319/1
Contract AF19 628 319 Unclassified report
AFCRL 63-258; AD 404 261
Rept. on Proj. VELA-UNIFORM.
See also AD-427 136.

Descriptors: (*Seismic waves, Diffraction), (*Wave transmission, Wedges), (*Iterative methods, Wave transmission), Elasticity, Mechanical waves, Geophysics, Earth, Surface properties, Lithosphere, Seismology, Propagation.

A method is introduced by which transmission or conversion coefficients can be readily calculated for surface wave diffraction at crustal discontinuities which can be idealized as wedge-shaped obstacles. The method, an interation procedure, is illustrated by an application to Rayleigh wave propagation on elastic wedges with free boundaries. It is shown that the leading term of the iteration procedure yields an expression for the transmission coefficient which matches the experimental data for a range of wedge angles which includes the crustal wedges commonly found in seismic practice. Numerical data is presented which illustrates the transmission coefficient's variation in terms of Poisson's ratio, and the wedge angle. (Author)

TID-21435 Div. 2
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
GEOLOGIC ASPECTS OF THORIUM RECOVERY FROM COMMON ROCKS.
Annual rept. for 1 Jun 63-31 May 64.
31 May 64, 7p
Contract W-7405-eng-26
Unclassified report

Subcontracted to Rice Univ., Houston, Tex.

Descriptors: (*Rock (Geology), Thorium), (*Thorium, Recovery).

3. Chemical Warfare Equipment and Materials

No Entries

4. Chemistry

ANL-6900 Div. 4, 20
CFSTI Prices: HC$7.00

Argonne National Lab., Ill.
CHEMICAL ENGINEERING DIVISION SEMIANNUAL REPORT, JANUARY-JUNE 1964.
Aug 64, 340p
Contract W-31-109-eng-38
Unclassified report

Descriptors: (*Chemical engineering, Reviews).

ANL-6931 Div. 4, 25
CFSTI Prices: HC$2.00

Argonne National Lab., Ill.
ANALYTIC SELF-CONSISTENT FIELD WAVE FUNCTIONS AND COMPUTER PROPERTIES FOR HOMONUCLEAR DIATOMIC MOLECULES,
by Arnold C. Wahl. Aug 64, 41p
Contract W-31-109-eng-38
Unclassified report

Descriptors: (*Diatomic molecules, Field theory).

ANL-6934 Div. 4
CFSTI Prices: HC$2.00

Argonne National Lab., Ill.
INTERBUILDING FUEL TRANSFER COFFIN FOR THE EBR-II REACTOR,
by G. J. Bernstein, A. A. Chilenskas, and R. F. Malecha.
Sep 64, 21p
Contract W-31-109-eng-38
Unclassified report

Descriptors: (*Reactor fuels, Containers).

ANL-Trans-144 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Argonne National Lab., Ill.
A STUDY OF MASS TRANSFER IN A PULSED EXTRACTION COLUMN WITH ROTATING FLOW,
by V. I. Doronin and A. M. Nikolaev. 1964, 8p
Unclassified report

Trans. of Izvestiya Vysshykh Uchebnykh Zavedenii. Khimiya i Khimicheskaya Tekhnologiya (USSR) 1964, v. 7, p. 665-8.

Descriptors: (*Industrial equipment, Transport properties).

APDA-164 Div. 4
CFSTI Prices: HC$2.00 MF$0.50

Atomic Power Development Associates, Inc., Detroit, Mich.
DETERMINATION OF CARBON IN SODIUM BY A HIGH-TEMPERATURE COMBUSTION METHOD UTILIZING GAS CHROMATOGRAPHY,
by H. Bradley and S. A. Meacham. 25 Nov 64, 34p
Contract AT(11-1)-865
Unclassified report

Descriptors(*Carbon, Chromatography), (*Sodium, Chemical analysis).

COO-1148-92 Div. 4
CFSTI Prices: HC$1.00 MF$0.50

Michigan Univ., Ann Arbor.
VOLTAMMETRY OF THE QUINONE: HYDROQUINONE SYSTEM IN PYRIDINE AT THE PYROLYTIC GRAPHITE ELECTRODE,
by W. Richard Turner and Philip J. Elving. 29 Dec 64, 15p
Contract AT(11-1)-1148

Unclassified report

Descriptors: (*Quinones, Electrochemistry), (*Pyrolytic graphite, Electrodes).

DP-923 Div. 4
CFSTI Prices: HC$1.00

Savannah River Lab., E. I. Du Pont de Nemours and Co., Aiken, S. C.
GAS FORMATION IN ANION EXCHANGE RESIN BEDS,
by E. Kenneth Dukes, Glenn A. Burney, and Richard M. Wallace. Oct 64, 15p
Contract AT(07-2)-1

Unclassified report

Descriptors: (*Ion exchange resins, Gases).

HW-83461 Div. 4, 13, 20
CFSTI Prices: HC$3.00

Hanford Atomic Products Operation, Richland, Wash.
ION EXCHANGE RECOVERY OF CESIUM FROM ALKALINE SUPERNATANT WASTE, SCALE-UP STUDIES,
by R. P. Popovich. Sep 64, 45p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Cesium, Ion exchange), (*Radioactive waste, Processing).

HW-83611 Div. 4, 20
CFSTI Prices: HC$1.00

Hanford Atomic Products Operation, Richland, Wash.
PROGRESS IN ACTINIDE ELEMENT CHEMISTRY. A SUMMARY OF HANFORD LABORATORIES ACHIEVEMENTS IN THIS PROGRAM UNDER GENERAL ELECTRIC, 1956-1964,
by L. L. Burger. Nov 64, 23p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Actinide series, Chemistry).

LA-DC-6804 Div. 4, 16
CFSTI Prices: HC$1.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
ANALYTICAL CHEMISTRY IN INDUSTRIAL HYGIENE,
by H. F. Schulte. 1964, 15p CONF-641206-1
Contract W-7405-eng-26

Unclassified report

Meeting of the St. Louis Society of Analysis, St. Louis.

Descriptors: (*Industrial medicine, Analytical chemistry).

NYO-2471-6 Div. 4, 14
CFSTI Prices: HC$3.00 MF$0.50

Cornell Univ., Ithaca, N. Y. Materials Science Center.
DIELECTRIC PROPERTIES OF POTASSIUM HALIDES CONTAINING NO2 AND NO3 IONS.
Thesis,
by C. Michael Moriarty. Feb 65, 52p Rept. no. 290
Contract AT(30-1)-2471

Unclassified report

Descriptors: (*Potassium compounds, Halides), (*Halides, Dielectric properties), (Nitrogen compounds, Oxides).

ORNL-3732 Div. 4, 20
CFSTI Prices: HC$2.00

Oak Ridge National Lab., Tenn.
EFFICIENCY AND FLOW CAPACITY OF PULSED COLUMNS USED FOR THE SEPARATION OF URANIUM FROM THORIUM BY SOLVENT EXTRACTION WITH DI-sec-BUTYLPHENYL-PHOSPHONATE,
by A. D. Ryon and R. S. Lowrie. Jan 65, 35p
Contract W-7405-eng-26

Unclassified report

Descriptors: (*Uranium, Solvent extraction), (*Thorium, Solvent extraction).

ORNL-3750 Div. 4
CFSTI Prices: HC$5.00

Oak Ridge National Lab., Tenn.
ANALYTICAL CHEMISTRY DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING NOVEMBER 15, 1964.
Jan 65, 144p
Contract W-7405-eng-26

Unclassified report

Descriptors: (*Analytical chemistry, Instrumentation).

ORNL-P-707 Div. 4
CFSTI Prices: HC$3.00 MF$0.50

Oak Ridge National Lab., Tenn.
A STUDY OF THE PHASE BEHAVIOR OF THE ALUMINUM TRICHLORIDE-ZIRCONIUM TETRACHLORIDE SYSTEM,
by Arthur J. Shor. Dec 64, 56p
Contract W-7405-eng-26

Unclassified report

Thesis submitted to Univ. of Tennessee, Knoxville.

Descriptors: (*Aluminum compounds, Chlorides), (*Zirconium compounds, Chlorides), (*Chlorides, Phase studies).

ORNL-TM-823 Div. 4, 20
CFSTI Prices: HC$6.60 MF$1.28

Oak Ridge National Lab., Tenn.
CHEMICAL TECHNOLOGY DIVISION, UNIT OPERATIONS SECTION MONTHLY PROGRESS REPORT, OCTOBER 1963,
by M. E. Whatley, P. A. Haas, R. W. Horton, A. D. Ryon, and J. C. Sussath. Aug 64, 66p
Contract W-7405-eng-26

Unclassified report

Descriptors: (*Radioactive waste, Disposal), (*Reactor fuels, Separation).

ORNL-TM-836 Div. 4, 20
CFSTI Prices: HC$2.60 MF$1.10

Oak Ridge National Lab., Tenn.

CHEMICAL TECHNOLOGY DIVISION, UNIT OPERATIONS SECTION MONTHLY PROGRESS REPORT, FEBRUARY 1964,
by M. E. Whatley, P. A. Haas, R. W. Horton, A. D. Ryon, and J. C. Suddath. Aug 64, 30p
Contract W-7405-eng-26

Unclassified report

Descriptors: (*Radioactive waste, Separation).

Patent 3,164,440 Div. 4

GAS-SOLIDS CONTACTING METHOD.
Patent assigned to AEC,
by Ralph P. Levey, Jr. 5 Jan 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Chemical reactions), (*Chemical reactions, Patents), Solids, Gases, Surface properties, Manufacturing methods, Uranium compounds, Oxides.

A method is disclosed of carrying out a fluidization process for contacting a bed of particulate solids with a gas. In an example, the method is used in a reaction reducing U3O8 to UO2 with hydrogen and then hydrofluorinating the resulting UO2 to UF4.

TID-21443 Div. 4, 20
CFSTI Prices: HC$1.00 MF$0.50

Chicago Univ., Ill.
APPLICATION OF FISSION PRODUCT SOURCES IN ORGANIC RADIATION CHEMISTRY.
Final summary rept. for 1 May 59-30 Jun 64,
by Weldon G. Brown. 30 Jun 64, 12p
Contract AT(11-1)-754

Unclassified report

Descriptors: (*Fission products, Sources), (*Radiation chemistry, Fission products).

UCRL-11704 Div. 4, 25
CFSTI Prices: HC$4.00 MF$0.75

Lawrence Radiation Lab., Univ. of California, Berkeley.
TEMPERATURE DEPENDENCE OF TRANSVERSE RELAXATION TIME OF OXYGEN-17 IN AQUEOUS SOLUTIONS CONTAINING CUPRIC AND CHROMOUS IONS.
Thesis,
by Charles Waymond Merideth. Jan 65, 102p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Oxygen, Relaxation time), (*Copper, Ions), (*Chromium, Ions).

UCRL-11763 Div. 4
CFSTI Prices: HC$7.60

Lawrence Radiation Lab., Univ. of California, Berkeley.
REACTIONS OF ACTIVE NITROGEN WITH SULFUR COMPOUNDS.
Thesis,
by Jerry J. Smith. Jan 65, 74p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Nitrogen, Chemical reactions), (*Sulfur compounds, Chemical reactions).

5. Communications

Patent 3,162,724 Div. 5

SYSTEM FOR TRANSMISSION OF BINARY INFORMATION AT TWICE THE NORMAL RATE.
Patent assigned to Army,
by Otmar E. Ringelhaan. 22 Dec 64

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Pulse communication systems), (*Pulse communication systems, Patents), (*Data transmission systems, Patents), Decoding, Signals, Communication systems, Design.

The system is for forming and decoding biternary signals from a binary train. The system includes an input terminal, a gate, a clock, a bi-stable flip-flop, a delay line, a combining circuit, a transmission channel, a full-wave rectifier and a binary output.

Patent 3,164,800 Div. 5

UNDERWATER TELEPHONY.
Patent assigned to Navy,
by John T. Kroenert. 5 Jan 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Underwater communication systems), (*Underwater communication systems, Patents), (*Telephone communication systems, Underwater), Transducers, Telephone equipment, Modulators, Oscillators, Band-pass filters, Amplifiers, Power supplies, Rectifiers, Electronic switches, Wiring diagrams.

The apparatus enables naval ships or stations to communicate with one another solely through water and without connecting wires. The apparatus employs a dual transducer, a telephone head set or speaker, a microphone or transducer, a balanced modulator, an oscillator, a band-pass filter, a listening or receiver amplifier, a power amplifier, a power supply and rectifier, an audio amplifier, and a plurality of two-way switches.

PB-166 701 Div. 5, 8, 12
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
SUGGESTED CRITERIA FOR LIMITING SATELLITE POWER IN CHANNELS SHARED WITH GROUND SYSTEMS,
by Harry Fine and Julian T. Dixon. 1 Jun 61, 7p
Rept. no. TRR-5.2.1, 5674

Unclassified report

Descriptors: (*Communication satellites (Active), Limiters), (*Limiters, Radiofrequency power), (*Radiofrequency power, Limiters), Communication systems, Satellites (Artificial), Ground support equipment, Noise (Radio), Communication theory.

This report is written as a result of an effort to provide a curve or curves which might be used as a simple allocation tool to limit the power radiated from a satellite transmitter, operating on a shared channel, in order to protect ground services sharing the same frequency spectrum. Such protection of a ground communication

system from a satellite system is inherently complex because protection should be afforded in the space, frequency, and time domains. However, if a number of assumptions and limitations are made, a workable set of curves or a nomogram may be derived for use as a simple and convenient allocation tool.

PB-166 707 Div. 5, 15
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D.C. Engineering Dept.
NIGHT-TO-NIGHT FADING OF MEDIUM FREQUENCY SKYWAVE MODES,
by E. F. Vandivere, Jr. and G. L. Waters. 18 Feb 48, 9p TID-4.1.2

Unclassified report

See also PB-166 694.

Descriptors: (*Medium frequency, Attenuation), (*Ionospheric propagation, Medium frequency), (*Electromagnetic wave reflections, Statistical analysis), Radio waves, Statistical distributions, Radio fields, Antenna radiation patterns, Probability.

In a previous report the analytical factors have been isolated which are needed to represent skywaves over an arbitrary ground from an antenna of arbitrary radiation characteristics as the resultant of fields in several skywave modes. However the fields dealt with are annual root mean square averages, while in practical application in allocation it is generally distribution statistics that are useful. A representation is here derived of the first, second, and third modes in terms of which reasonable estimates of the distribution statistics of the resultant may be made.

PB-166 713 Div. 5, 8
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
LONG DISTANCE TROPOSPHERIC PROPAGATION IN THE ULTRA HIGH FREQUENCY BAND 288-700 MC,
by Harry Fine and Frank V. Higgins. 13 Oct 50, 32p
Rept. nos. TRR-2.4.10, 55847

Unclassified report

Descriptors: (*Ultrahigh frequency, Propagation), (*Television stations, Ultrahigh frequency), Troposphere, Tables, Attenuation, Electromagnetic fields, Television communication systems, Radiofrequency interference.

In order to make intelligent estimates of service and interference in the UHF television band there is an urgent need for propagation curves in this ultra-high-frequency band. Therefore, even though the available data are very scanty, the Technical Research Division has undertaken to assemble and analyze these data in order to develop tentative propagation curves. In this report only propagation at distances beyond approximately 68 miles from the transmitter will be considered. A companion report will be published later covering propagation in the UHF band for the shorter distances.

PB-166 719 Div. 5, 8
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C.
NATIONAL COVERAGE OF STANDARD BROADCAST STATIONS DURING NIGHTTIME HOURS 1946-1956.
1 Oct 57, 31p Rept. nos. TRR-2.3.5, 51561

Unclassified report

Descriptors: (*Radio broadcasting, Distribution), (*Radio stations, Abundance), Radio interference, Noise (Radio), Atmospherics, Signal-to-noise ratio, Radio transmission, Radio communication systems, Radio signals.

The total combined nighttime coverage of all U. S. Standard Broadcast Stations is determined as of January 1, 1946 and January 1, 1956.

PB-166 729 Div. 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
ANALYSIS OF FIELD STRENGTH RECORDER CHARTS BY AUTOMATIC ELECTRONIC EQUIPMENT,
by George V. Waldo. 11 May 62, 21p
Rept. nos. TR-6201, 18516

Unclassified report

Descriptors: (*Radio fields, Recording systems), (*Radio signals, Measurement), (*Video signals, Measurement), Graphics, Design, Operation, Optical scanning.

A simple process for rapid analysis of field strength recorder charts has been devised in which periodic samples, instead of a continuous register of values, are recorded and subsequently analyzed. This report describes the construction and operation of the automatic electronic chart analyzer equipment. (Author)

PB-166 730 Div. 5, 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
CONTROL OF RADIO FREQUENCY INTERFERENCE FROM NONLICENSED APPARATUS,
by Herman Garlan and L. Glen Whipple. 1 Sep 61, 16p Rept. nos. TR-6104, 9363

Unclassified report

Elaboration of a paper presented at the National PGRFI Symposium on Radio Frequency Interference (3rd), Washington, D. C., on June 13, 1961.

Descriptors: (*Radiofrequency interference, Control), Electrical equipment, Electronic equipment, Electromagnetic waves, Propagation.

PB-166 731 Div. 5
CFSTI Prices: HC$1.00 MF$0.50

UHF-TV Project, Federal Communications Commission, Washington, D. C.
UHF ASSIGNMENT PLAN,
by Arnold G. Skrivseth. 29 May 61, 9p
Report UHF-TV-5.2.2

Unclassified report

Descriptors: (*Television stations, Distribution), Video signals, Mathematical models, Ultrahigh frequency, Radiofrequency interference, Effectiveness.

Studies have been conducted in Europe of the most efficient means of assigning channels when a number of conditions must be met as in the situation encountered in the UHF-TV band. The results of these studies have recently been published and from these an arrangement of channels has been developed which would theoretically permit assignment of over 8,000 stations in the UHF-TV band in the 48 states

of the continental U. S. without violation of any of the 'taboos' involved in the FCC rules. However, the taboos impose severe restrictions on the flexibility of assignment if this efficiency is to be approached. (Author)

PB-166 743 Div. 5, 25
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C.
Office of The Chief Engineer.
LASERS FOR COMMUNICATION,
by Elton D. Davis. 25 Apr 63, 15p Rept. no. R-6304
Unclassified report

Descriptors: (*Light communication systems, Lasers), (*Lasers, Light communication systems), Infrared radiation, Electromagnetic properties, Polarization, Gain, Space communication systems, Waveguides, Ruby, Gallium alloys, Arsenic alloys, Helium, Neon, Modulators, Demodulators.

Lasers will become important to communications people because they will permit pencil beams of communications signals on frequencies not presently used or allocated by the FCC, with a capability of transmitting huge quantities of intelligence over long distances. It must also be noted, however, that this new technique will not revolutionize conventional communications, since it requires an unobstructed optical transmission paths and such a requirement could be tolerated by few if indeed any of the existing users for radio. In short, it is not expected that lasers will alleviate the FCC's problem of shortage of frequencies. (Author)

PB-166 745 Div. 5, 30
CFSTI Prices: HC$2.00 MF$0.50

Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
REVIEW OF EXISTING SPEECH COMPRESSION SYSTEMS,
by Kenneth N. Stevens. Oct 60, 31p
RADC TN-60-197; AD 245 025
Unclassified report

Descriptors: (*Voice communication systems, Reviews), (*Speech compression, Intelligibility), Speech transmission, Speech recognition, Speech representation, Signal-to-noise ratio, Bandwidth, Performance (Engineering), Noise, Data processing systems.

An attempt is made to summarize quantitative information on a number of speech compression systems and to present a preliminary evaluation of the merits of the various compression techniques represented by these systems. In order to permit comparisons of the different systems, a single measure of intelligibility was used--the percentage of PB words correct. This particular measure was selected because many of the speech compression systems were tested directly with PB words. The performance of some systems, however, was measured with other types of speech material such as nonsense syllables, or with a closed set of monosyllabic words. In these cases, a conversion was made to PB-word intelligibility using the curves given in the proposed American Standard method for computing speech intelligibility.

PB-166 782 Div. 5, 1, 25
CFSTI Prices: HC$1.00 MF$0.50

Naval Medical Research Inst., Bethesda, Md.
FLUORESCENCE SPECTRA OF SOLID MATERIALS OBTAINED BY A MODIFICATION OF THE BECKMAN SPECTROPHOTOMETER.
Rept. no. 2,
by Alfred A. Schiller and Louis P. Cecchini. 20 Jul 48, 25p
Proj. NM001 008
ATI 209 258
Unclassified report

Available copy will not permit fully legible reproduction. Document contains halftone illustrations which are difficult to read in reprints.
See also PB-160 360.

Descriptors: (*Fluorescence, Spectrum analyzers), (*Night landings, Light communication systems), (*Light communications systems, Fluorescence), (*Textiles, Fluorescence), Spectrophotometers, Colorimetric analysis, Signals, Luminescence, Ultraviolet radiation, Colorimetry, Carrier landings, Landing aids, Visual signals.

An apparatus and procedure which permits utilization of the Beckman spectrophotometer for precision analyses of fluorescent radiation is described. The color and luminosity properties of a number of fluorescent signal fabrics against aluminum and brass backings and after prolonged ultraviolet irradiation have been determined. The fluorescence of each type of fabric was shown to have a high degree of monochromaticity. The luminosities of the fabrics were variable and not related to their color characteristics. The aluminum backing increased the luminous output in the majority of cases, whereas prolonged UV irradiation was found to significantly suppress luminosity. Discrepancies in color designation by manufacturers and wide variations in luminosity among the fabrics examined require that a systematic standardization of fluorescent materials used in visual communications be made. (Author)

6. Detection

Patent 3,162,854 Div. 6, 23

TARGET SIMULATOR FOR PULSE DOPPLER RADAR.
Patent assigned to Navy,
by Robert R. Campbell. 22 Dec 64
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Radar target position simulators), (*Radar target position simulators, Patents), (*Doppler radar, Training devices), Doppler effect, Doppler systems, Oscillators, Test equipment.

The radar target simulator is for testing an operator or for renewing his alertness. It is incorporated in a pulse Doppler radar system. A variable frequency oscillator is used to provide voltage oscillations in the intermediate frequency range. These voltage oscillations are made to vary in accordance with the 'closing' or 'opening' speed relation between the simulated target and the position of the equipment and the simulator to produce the Doppler effect.

Patent 3,164,076 Div. 6, 12, 24

IMAGE INTERCEPT TRACKING DEVICE.
Patent assigned to Army,
by David J. Sweigart and Pallip W. Carmack. 5 Jan 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Guided missile tracking systems), (*Guided missile tracking systems, Patents), (*Optical tracking, Ballistic cameras), Photographic equipment, Tracking, Images, Antimissile defense systems, Interception.

The camera-mounted device utilizes a half-section assembly including a pair of aperture members movably mounted upon the lens barrel of the camera. The aperture members are, both individually and as a unit, driven by the motion of two control telescopes operating through a unique array of mountings and servomechanisms. Each aperture member is forced to duplicate precisely the motion of its control telescope. The most important advantage of the image intercept tracker lies in the fact that it can be used to obtain ballistic track data during daylight tests involving a killer missile and its target. Trajectories of both missiles are traced on each plate of the system stations.

Patent 3,164,725 Div. 6

OPTICAL RANGE FINDER.
Patent assigned to Army,
by Harold W. Straub. 5 Jan 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Optical equipment), (*Optical equipment, Patents), (*Range finding, Optical equipment), Light transmission, Modulation, Electromagnetic wave reflections, Phase measurement.

The optical range finder combines the advantages of prior optical and radar range finders. Modulated light is directed onto a target sighted by an operator, and the phase of the reflected light is compared with that of the radiated light to provide an indication of range to the target.

Patent 3,164,745 Div. 6, 8

SWEEP COLLAPSE AND ROTATION FAILURE ALARM SYSTEM FOR PPI DISPLAY DEVICE.
Patent assigned to Army,
by Abraham Shulman. 5 Jan 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Plan position indicators), (*Plan position indicators, Patents), (*Monitors, Plan position indicators), Radar scanning, Failure (Mechanics), Warning systems, Computers, Amplifiers, Drives.

The sweep collapse alarm system is utilized in a PPI radar system. It includes a rotation monitor, an R.M.S. computer and an arrangement for applying two input signals to both the monitor and the computer. An amplifier is coupled to the monitor and computer. A relay driver is coupled to the amplifier and a relay is coupled to the driver.

PB-166 784 Div. 6
CFSTI Prices: HC$2.00 MF$0.50

Naval Ordnance Test Station, China Lake, Calif.

VISUAL SEARCH FOR TARGETS: LABORATORY EXPERIMENTS,
by Ronald A. Erickson. Oct 64, 45p NOTS-TP-3328 NAVWEPS 8406; AD 448 468

Unclassified report

Descriptors: (*Tracking, Performance (Human)), (*Target recognition, Visual acuity), (*Target acquisition, Visual acuity), Visual perception, Display systems, Performance tests, Probability, Correlation techniques, Analysis of variance.

Three laboratory experiments performed at the U. S. Naval Ordnance Test Station (NOTS) on visual search for targets are described in this report. The first experiment was on peripheral acuity and static search, the second on static and dynamic search, and the third on static search with a linear cue. Studies on visual search for targets were initiated when a review of existing literature showed a lack of data--even laboratory data--that would be useful in the analysis and design of weapon systems involving visual target acquisition. The NOTS experiments described here are the first in a series to provide information on how search time is affected by display- and observer-dependent parameters. Although such data should not be extra-polated to operational situations, they do provide a basis for understanding the search process and a foundation for progressing to more complex, and thereby operational, situations. The experimental conditions and results can also be used to test the many existing, and apparently untested, mathematical models of a visual detection task.

7. Electrical Equipment

No Entries

8. Electronics and Electronic Equipment

AD-299 284 Div. 8, 6
CFSTI Prices: HC$3.00

Stanford Electronics Labs., Stanford Univ., Calif.
BROADBAND TUNNEL-DIODE AMPLIFIERS.
Interim technical rept. for Sep 61-Aug 62,
by Bengt T. Henoch and Yngvar Kvaerna. Aug 62,
96p Technical rept. nos. 213-2, SEL-62-099
Contracts AF33 616 7944, AF18 603 53, Proj. 1036, Task 403602

Unclassified report

Descriptors: (*Tunnel diodes, Microwave amplifiers), (*Microwave amplifiers, Tunnel diodes), (*Broadband, Microwave amplifiers), Design, Gallium alloys, Antimony alloys, Wiring diagrams, Electronic countermeasures, Radar, Radio astronomy, Phase shift, Control, Radiofrequency filters, Negative resistance circuits.

A tunnel-diode amplifier can be broadbanded by incorporating the diode in a filter structure where the reactive elements of the diode are part of the filter. This is described as matching the amplifier impedance to a 'constant-gain circle' in the impedance plane. Design principles are given for amplifiers of this type, and the

frequency response is calculated for a few circuits. The results show bandwidths much larger than can be handled by the presently available circulators needed for separating the input and output ports. Reflections from the circulator can easily give rise to oscillation, especially outside the band of interest, because an amplifier with only reactive tuning is active for all frequencies up to the diode cut-off frequency. A solution to this problem is to introduce resistive elements in the amplifier circuit so as to have negligible effect in the band of interest, but to load down the tunnel diode so as to make the whole circuit passive outside this band. The theory of such selective loaded amplifiers is discussed, and several practical realizable circuits are described.

Patent 3,162,498 Div. 8

INCLINED CHASSIS MOUNTING FOR ELECTRONIC EQUIPMENT.
Patent assigned to Air Force,
by Vincent J. Galati and Edwin L. Herd. 22 Dec 64
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Supports), (*Supports, Patents), (*Electronic equipment, Supports), Television receivers, Mounting brackets.

Electronic equipment employing picture tubes or dials is mounted at an incline for ease of viewing. The chassis is mounted in a cabinet and includes an extensible arm with a slide-extension member telescoping within the length of a carriage-arm member. This member swings on a horizontal pivot. A stop member and a latch are provided.

Patent 3,162,773 Div. 8

TRANSISTORIZED LINEAR ALTERNATING CURRENT SERVO COMPENSATOR AND QUADRATURE REJECTOR.
Patent assigned to Navy,
by Arnolds Jansons. 22 Dec 64 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Servomechanisms), (*Servomechanisms, Patents), (*Radar antennas, Servomechanisms), Alternating current, Demodulators, Transistors, Servo amplifiers, Control systems, Design, Circuits.

The alternating current demodulation, quadrature rejection, compensation, and modulation circuit is utilized in a servo system for controlling a radar antenna. A transistorized demodulator, modulator and servo compensating circuit is incorporated between the preamplifier and power amplifier of a servo system.

Patent 3,164,768 Div. 8

GARNET MICROWAVE PULSE GENERATOR.
Patent assigned to Air Force,
by Martin R. Stiglitz and Frederic R. Morgenthaler.
5 Jan 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Pulse generators), (*Pulse generators, Patents), (*Microwaves, Pulse generators), Design, Very high frequency, Garnet.

The apparatus is for the generation of short pulses of very high frequency energy. The generator utilizes a crystal of the ferromagnetic material yttrium iron garnet, situated within a transmission line device, either resonant or nonresonant, where it is subjected to a microwave signal and a continuous magnetic field. When a pulsed magnetic field is applied along the direction of the continuous magnetic field, pulses of microwave energy of higher frequency than the microwave signal are generated.

Patent 3,165,651 Div. 8, 25

PIEZOELECTRIC CRYSTAL APPARATUS.
Patent assigned to Army,
by Rudolf H. Bechmann. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Crystal oscillators), (*Crystal oscillators, Patents), (*Piezoelectric crystals, Crystal oscillators), Excitation, Electric fields, Electrodes, Mechanical drawings.

The thickness-shear mode photoelectric crystal element is adapted to vibrate in an oscillation circuit. Components for providing an electric field parallel to the major surface of the element comprise a pair of discrete electrodes mounted on at least one of the major surfaces, the proximal ends of the electrodes being spaced from each other to form a gap therebetween. The gap is oriented perpendicular to the Z'-axis of the element.

Patent 3,165,743 Div. 8, 6, 12

AMPLITUDE/PHASE MONOPULSE ANTENNA SYSTEM.
Patent assigned to Army,
by Leonard Hatkin. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Slot antennas), (*Slot antennas, Monopulse radar), (*Multiple beam antennas, Slot antennas), Radar antennas, Antenna radiation patterns, Polarization, Satellite antennas, Phase (Electronics).

The antenna system is adapted to provide azimuth and elevation data on a monopulse basis. The system simultaneously produces two radiation patterns having field configurations such that the azimuth amplitude response in each mode is uniform and which are further characterized in that the difference in phase between the two patterns is directly proportional to the azimuth angle of a target and the difference in the amplitude of the two patterns is proportional to the elevation angle of the target.

PB-166 684 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communication Commission, Washington, D. C. Engineering Dept.
A SURVEY OF THE PROBLEM OF PREDICTING GROUNDWAVE PROPAGATION OVER AN EARTH OF INHOMOGENEOUS CONDUCTIVITY,
by E. F. Vandivere, Jr. 17 Mar 48, 16p TID-2,3,2
Unclassified report

Descriptors: (*Radio waves, Propagation), Wave transmission Radiofrequency interference, Earth, Electrical properties, Boundary value problems, Radio communication systems.

It is the object of this report to note the results of a recent, critical survey of the various methods proposed or in use for the solution of this problem. Of the five rules discussed, that of Grosskopf promises to be the most accurate in the plane-earth range. Kirke's rule, however, is in reasonable agreement with that of Grosskopf in the plane-earth range, is at this time more practical and appears to be reasonable in the diffraction zone.

PB-166 685 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
EFFECTS OF WEATHER CONDITIONS ON GROUNDWAVE FIELD INTENSITIES FOR WCAU, BALTIMORE PATH AT STANDARD BROADCAST FREQUENCY,
by F. R. Gracely. 22 Dec 47, 10p TID-2.3.1
Unclassified report

Descriptors: (*Radio waves, Propagation), (*Meteorological parameters, Radiofrequency interference), (*Atomospherics, Radiofrequency interference), Radio broadcasting, Wave transmission, Radio fields, Intensity, Measurement, Radio communication systems.

The relationships between field intensities and weather conditions discussed here were obtained from a detailed study comparing signal intensities over one path with the official Weather Bureau data at each end of the path. Signal intensities received at Baltimore from station WCAU, 1170 kc/s, in Philadelphia were compared with official Baltimore and Philadelphia Weather Bureau data. To summarize, it was quite evident that precipitation especially when heavy, affected field intensities, but the trends are far from being self-consistent throughout. Earth moisture results show general characteristics very similar to those for precipitation. No appreciable degree of correlation with atmospheric pressures was noted. It was found that the best correlations existed with respect to temperature, with instantaneous 1:30 PM temperatures showing possibly a slightly better comparison with 1:30 PM field intensities than the 24 hour mean temperatures did. Results for humidity were confined to a few individual daily coincidences which were apparent after temperature effects had been removed.

PB-166 686 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
PHYSICAL LIMITATIONS TO DIRECTIONAL ANTENNA SYSTEMS IN THE STANDARD BROADCAST BAND,
by Harry Fine. 8 Oct 52, 9p
Rept. no. TRR-1.2.6, 81680
Unclassified report

Descriptors: (*Antenna radiation patterns, Field theory), (*Field theory, Antenna radiation patterns), (*Antennas, Medium frequency), Radio waves, Statistical analysis, Vector analysis, Operation, Intensity, Ionospheric propagation, Radio fields.

The random variations of the field intensity radiated from a directional antenna system is described statistically as the sum of the constant theoretical field plus a randomly varying Rayleigh error field. This error field is proportional to the theoretical root sum squared field of the array. It is expected that the theory developed will hold for directional antenna arrays in all bands.

PB-166 687 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C.
RADIATION FROM GROUNDED SLANT ANTENNAS,
by Harry Fine. 30 Jun 51, 8p TRR-1.2.5
Unclassified report

Descriptors: (*Antenna radiation patterns, Field theory), (*Field theory, Antenna radiation patterns), (*Antennas, Ionospheric propagation), Vector analysis, Intensity, Radio waves, Antenna configurations, Radio fields.

This report is a brief study of the radiation characteristics of a grounded slant antenna. The general formulae for radiation from this type of antenna over a perfectly conducting earth are derived for sinusoidal current distribution.

PB-166 688 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
EFFECTIVE HEIGHTS OF RECEIVING ANTENNAS,
by E. F. Vandivere, Jr. 14 Nov 46, 10p TID-1.2.3
Unclassified report

Descriptors: (*Radio waves, Antennas), (*Ionospheric propagation, Antennas), (*Antennas, Radio receivers), Effectiveness, Antenna configurations, Radiofrequency power, Field theory, Radio fields.

It is the object of this report to collect some formulas that are apparently fairly reliable for the effective heights, with respect to groundwave and with respect to skywave, of the three types of antennas chiefly used in field intensity measurements, viz., the vertical wire, the horizontal doublet, and the loop. (Author)

PB-166 689 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
THE RADIATION PATTERN IN THE VERTICAL PLANE OF A COAST-SIDE VERTICAL ANTENNA,
by E. F. Vandivere. 1 Oct 46, 8p TID-1.2.2
Unclassified report

Descriptors: (*Antenna radiation patterns, Field theory), (*Field theory, Antenna radiation patterns), (*Antennas, Ionospheric propagation), Radio waves, Reflection, Radio fields.

Formulas are derived for the radiation pattern in the vertical plane of a coast-side vertical antenna.

PB-166 690 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communication Commission, Washington, D. C. Engineering Dept.
RADIATION PATTERN IN THE VERTICAL PLANE ON A VERTICAL ANTENNA OVER AN EARTH OF REFLECTION COEFFICIENT R sub v.
Revised ed.,
by E. F. Vandivere, Jr. 6 Nov 46, 5p TID-1.1.1
Unclassified report

Revision of rept. dated 28 Aug 46.

Descriptors: (*Antenna radiation patterns, Field theory), (*Field theory, Antenna radiation patterns), (*Antennas, Inospheric propagation), Radio waves, Radio fields, Reflection.

This report derives the radiation pattern in the vertical plane in the simple terms of direct and reflected waves without other considerations.

PB-166 691 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
SOLAR CYCLE VARIATIONS OF SKYWAVE SIGNAL RANGES AT STANDARD BROADCAST FREQUENCIES,
by F. R. Gracely. 31 Dec 47, 17p TID-4.3.2
Unclassified report

Descriptors: (*Ionospheric propagation, Radio Waves), (*Radio waves, Ionospheric propagation), (*Solar disturbances, Radiofrequency interference), Atmospherics, Periodic variations, Radio broadcasting, Wave transmission, Radio fields, Ionosphere, Intensity, Nomographs.

A new method is here presented for obtaining medium frequency skywave signal intensities with the inclusion of adjustments for solar cycle variation. The nomographic form of presentation is used to reduce the combined information to the simplest possible form. Given the sunspot number, the path mid point latitude, and the path length, it enables the user to obtain the 10% Skywave Signal Range, for any part of a sunspot cycle directly by simply applying a straightedge across the known values. (Author)

PB-166 692 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
GENERAL STAISTICS FOR SKYWAVE PROPAGATION,
by E. F. Vandivere. 21 Apr 47, 5p TID-4.3.1
Unclassified report

Descriptors: (*Ionospheric propagation, Radio waves), (*Radio waves, Ionospheric propagation), Ionosphere, Electromagnetic wave reflections, Radio fields, Intensity, Statistical analysis, Radio communication systems.

A view rather generally held is that a satisfactory account can be given of skywave field intensities by assuming essentially ray optics and by representing the field as the resultant of several fields that simultaneously arrive by zig-zag paths reflected between the earth and the E- or F-layer. In the following, the term 'nth mode' will be used to refer to such a zig-zag path involving n reflections at the layer and n-1 reflections at the ground. The object of this report is to set up a frame-work of statistical theory that appears necessary to make use of such a modal representation.

PB-166 693 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
FACTORS FOR COMPUTING MODAL AND RESULTANT SKYWAVE FIELD INTENSITIES,
by E. F. Vandivere and G. L. Waters.
2 May 47, 7p TID-2.5.6 Unclassified report

Descriptors: (*Ionospheric propagation, Radio waves), (*Radio waves, Ionospheric propagation), (*Antenna radiation patterns, Mathematical prediction), Ionosphere, Electromagnetic wave reflections, Radio communication systems.

The report (PB-166 694) 'Experimental Reflection Coefficients for the E-Layer' presents graphs and an equation in terms of which the field intensity at any distance and any latitude may be computed for an antenna of any directional characteristics if the pertinent radiated fields for the antenna of interest are substituted for certain values of the graphs. This method is laborious and gives only one modal field intensity at one distance. Another method follows giving an expression which, when used with a factor for directional characteristics, will give modal and resultant field intensities for a wide range of values.

PB-166 694 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
EXPERIMENTAL REFLECTION COEFFICIENTS FOR THE E-LAYER: ANALYSIS OF EXPERIMENTAL RESULTANT SKYWAVE FIELDS INTO MODES,
by E. F. Vandivere, H. Fine, L. Light, G. L. Waters, and J. Deitz. 22 Apr 47, 18p TID-2.5.5
Unclassified report

Descriptors: (*Ionospheric propagation, Radio waves), (*Radio waves, Ionospheric propagation), (*Electromagnetic wave reflections, Ionosphere), Antenna radiation patterns, Radio fields, Angle of arrival, Statistical analysis, Experimental data, Graphics.

The report (PB-166 692) 'General Statistics for Skywave Propagation' outlines a statistical theory which culminates in an equation. This equation is in a form suitable for the analysis of experimental skywave curves for the implicit E-layer reflection coefficients. It is the object of this report to perform such an analysis on the assumption that F-layer propagation has contributed to the shape and value of the experimental curves to a negligible extent.

PB-166 695 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
ATTENUATION IN SKYWAVE TRANSMISSION MODES ON ACCOUNT OF PATH LENGTH.
21 Aug 46, 5p TID-2.5.1
Unclassified report

Descriptors: (*Ionospheric propagation, Radio waves), (*Radio waves, Ionospheric propagation), Ionosphere, Electromagnetic wave reflections, Attenuation, Attena radiation patterns, Radio fields, Intensity, Mathematical prediction.

PB-166 696 Div. 8, 5
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C.
ENGINEERING CONFERENCE IN THE MATTER OF AMENDMENT OF SECTION 3.606 OF THE COMMISSION'S RULES AND REGULATIONS, AND AMENDMENT OF THE COMMISSION'S RULES, REGULATIONS AND STANDARDS CONCERNING THE TELEVISION AND FREQUENCY MODULATION BROADCASTING SERVICES. VOLUME I.
31 May 49, 35p 36830, Docket 8736 VI Unclassified report

Rept. of the ad hoc Committee for the evaluation of the radio propagation factors concerning the television and frequency modulation broadcasting services in the frequency range between 50 and 250 mc.

Descriptors: (*Television stations, Standards), (*Frequency modulation, Standards), (*Radio waves, Propagation), (*Symposia, Radio broadcasting), Very high frequency, Communication equipment, Antenna radiation patterns, Terrain, Troposphere, Communication theory, Wave transmission, Video signals.

CONTENTS: A. Prediction of Service Field Intensities. (1) Modification of Ground Wave Signal Range Curves. (2) Apparent Transmitting Antenna Height. (3) Receiving Antenna Height-Gain Function. (4) Correction Factors for Standard Curves. B. Evaluation of Random Terrain Variations. C. Tropospheric Propagation Curves. D. Method of Combining the Effects of the Spatial and Time Variations of the Desired Signal and One or More Interfering Signals. (1) Desired Signal Only. (2) Desired and One Undesired Signal. (3) Methods of Representing the Distribution of Service for Various Powers, Signal Ratios and Station Separations.

PB-166 697 Div. 8, 5
CFSTI Prices: HC$3.00 MF$0.75

Federal Communications Commission, Washington, D. C.
ENGINEERING CONFERENCE IN THE MATTER OF AMENDMENT OF SECTION 3.606 OF THE COMMISSION'S RULES AND REGULATIONS, AND AMENDMENT OF THE COMMISSION'S RULES, REGULATIONS AND STANDARDS CONCERNING THE TELEVISION AND FREQUENCY MODULATION BROADCASTING SERVICES. VOLUME II.
7 Jul 50, 79p 54382, Docket-8736 V2

Unclassified report

Rept. of the ad hoc Committee for the evaluation of the radio propagation factors concerning the television and frequency modulation broadcasting services in the frequency range between 50 and 250 mc.
See also PB-166 696.

Descriptors: (*Television stations, Standards), (*Frequency modulation, Standards), (*Radio wave, Propagation), (*Symposia, Radio broadcasting), Wave transmission, Communication theory, Graphics, Video signals.

This report presents the factors which are important to the prediction of television and FM service and discusses methods of using these factors in allocation studies where the effects of all stations on the same and adjacent channels must be included.

PB-166 698 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
A MEANS OF ESTIMATING THE RADIATION FROM AND INTERFERENCE POTENTIALITY OF A HYPOTHETICAL RADIOLOCATION STATION,
by Jules Deitz. 4 Jun 51, 6p Rept. no. TRR-6.1.10, Docket-9233

Unclassified report

Descriptors: (*Radio waves, Propagation), (*Antenna radiation patterns, Mathematical prediction), (*Ionospheric propagation, Radio waves), Radio communication systems, Atmospherics, Communication theory, Radio fields, Intensity.

The purpose of this report is to provide a means of estimating the radiation and interference potentialities of a hypothetical radiolocation station. In order to accomplish the desired result it is necessary to make many assumptions. For reasons of impracticability or inadequate knowledge certain radio services are not standardized with respect to 'what constitutes a satisfactory signal'. In order to avoid an estimate based on only one set of circumstances this report provides a choice of operating conditions and standards. A graph is presented to show how the radiated field from a vertical antenna attenuates with distance. The frequency is considered to be approximately 1750 Kc and the radiated power 310 watts. There are two groundwave curves. One curve represents groundwave propagation over sea water and the other curve represents groundwave propagation over land of good conductivity. Both curves assume a smooth spherical earth with an effective radius of 4/3 of the true earth radius.

PB-166 699 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Engineering Dept.
SOME ILLUSTRATIVE EXAMPLES OF THE NATURE OF MEDIUM FREQUENCY SKYWAVE SERVICE,
by E. F. Vandivere and G. L. Waters. 7 Oct 47, 19p TID-5.3.1

Unclassified report

Descriptors: (*Ionospheric propagation, Radio waves), (*Radio waves, Ionospheric propagation), Radio broadcasting, Medium frequency, Atmospherics, Communication theory, Maps, Radio communication systems.

The examples are in the form of maps. Most of the maps in this particular report show skywave service with respect to atmospheric noise as the interference, although one map is included which shows service with respect to other station interference. Apart from the details mentioned above, the maps may be briefly described as showing the extent and frequency of occurrence of skywave service for several combinations of frequency and geographical location.

PB-166 702 Div. 8, 5
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
VHF TROPOSPHERIC RECORDING MEASUREMENTS OF PLANE AND CIRCULAR POLARIZED WAVES IN THE GREAT LAKES AREA,
by James S. Hill and George V. Waldo. 16 Apr 51, 26p TRR-2.4.11, 62838

Unclassified report

Research done in cooperation with United Broadcasting Co., Cleveland, Ohio, under contract to National Bureau of Standards, Washington, D. C.

Descriptors: (*Radio waves, Propagation), (*Very high frequency, Radio transmission), (*Troposphere, Radio transmission, Great Lakes, Radio stations, Radio broadcasting, Frequency modulation, Polarization, Radio fields, Intensity, Measurement, Recording systems, Radio communication systems.

In February, 1950, the United Broadcasting Company entered into a contract with the United States Department

of Commerce, National Bureau of Standards to obtain information on tropospheric propagation in the Great Lakes area. The program of investigation was pointed specifically toward a study of the tropospheric propagation characteristics of circularly polarized waves as compared with plane polarized waves. Two commercial FM stations operating in this country using Circular Polarization were used. They were WHK-FM, Cleveland, and WHKC-FM Columbus. It was decided to locate the recording station in the Cleveland area so that propagation conditions across Lake Erie from Detroit could also be investigated and compared with the circular polarization propagation from Columbus. A number of sites were investigated in this area and a site near Hudson, Ohio, was finally selected.

PB-166 703 Div. 8, 5
CFSTI Prices: HC$4.00 MF$0.75

Federal Communications Commission, Washington, D. C. Technical Research Div.
UHF PROPAGATION WITHIN LINE OF SIGHT,
by Harry Fine. 1 Jun 51, 102p
Rept no. TRR-2.4.12, 65409
Unclassified report

Descriptors: (*Radio waves, Propagation), (*Ultra-high frequency, Wave transmission), Television stations, Radio fields, Intensity, Attenuation, Terrain, Communication theory, Statistical analysis, Communication systems.

Several investigations were undertaken by the Technical Research Division of the Federal Communications Commission to advise the Commission of the physical effects incidental to the assignment of television stations in the Ultra High Frequency band. This report will treat with the behavior of tropospheric field intensities within line of sight. The subject material will be divided into two categories; Part I will treat the time fading at fixed locations and Part II will deal with the variation of field intensity from location to location. The mathematics and statistical theory involved in the treatment of the data are included in the Appendices.

PB-166 704 Div. 8, 2, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
FIELD STRENGTH RECORDINGS OF B. B. C. TELEVISION STATIONS DURING THE 1957-1958 SUNSPOT CYCLE PEAK,
by George V. Waldo and Charles K. Sheets.
10 Jun 59, 12p Rept. nos. TRR-2.5.8, 74537
Unclassified report

Descriptors: (*Sunspots, Radiofrequency interference), (*Ionospheric propagation, Video signals), (*Television stations, Great Britain), (*Video signals, Ionospheric propagation), Very high frequency, Radiofrequency power, Radio fields, Intensity, Measurement, Monitors, Maryland, Nebraska.

At a time when the seasonal F2 layer transmissions and the current sunspot cycle were both at their peaks, continuous field strength recordings were made at monitoring stations of the Federal Communications Commission at Laurel, Maryland, and at Grand Island, Nebraska, of the BBC-TV stations at London, England (on 41.5 Mc), and at Kirk O'Shotts, Scotland (on 53.25 Mc). The frequencies of these transmissions were below and above the 'maximum usable frequency' for these propagation paths. Results of these measurements were compared with data obtained at ionosphere sounding stations near the paths, and with CRPL predictions made 3 months in advance. There was very good agreement between the measurements, the calculations from vertical incidence data, and the predictions. (Author)

PB-166 706 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
SERVICE FIELD INTENSITY REQUIRED FOR RADIO PAGING SERVICE AT 40 MC/S,
by Harry Fine. 1964, 4p TRR-3.3.1
Unclassified report

Descriptors: (*Radio receivers, Very high frequency), (*Radio signals, Intensity), Radiofrequency interference, Noise (Radio), Urban areas, Reliability (Electronics).

The value of the signal strength required to permit 40 Mc/s radio receiver operation at 90% reliability was 43 dbu in suburban areas and 58 dbu in urban areas.

PB-166 708 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Techanical Research Div.
DIRECTIONAL ANTENNAS IN THE STANDARD BROADCAST BAND,
by Harry Fine. 15 Nov 49, 24p
Rept. nos. TRR-1.2.4, 47187
Unclassified report

Descriptors: (*Antennas, Design), Radio signals, Intensity, Power, Gain, Stability, Antenna masts, Amplitude modulation.

The formulas, concepts, and available curves needed to check the design of directional antenna arrays operating in the AM broadcast band are presented.

PB-166 709 Div. 8
CFSTI Prices: HC$3.00 MF$0.75

Federal Communications Commission, Washington, D. C. Technical Information Div.
SUMMARY OF TROPOSPHERIC PROPAGATION MEASUREMENTS AND THE DEVELOPMENT OF EMPIRICAL V H F PROPAGATION CHARTS.
Revised ed.
by E. W. Allen, W. C. Boese, and H. Fine.
26 May 49, 62p Rept. nos. TID-2.4.6, 36728
Unclassified report

Reference D to the rept. of the Ad Hoc Committee for the evaluation of the radio propagation factors concerning the television and frequency modulation broadcasting services in the frequency range between 50 and 250 mc.
Revision of rept. dated 18 Oct 48.

Descriptors: (*Propagation, Troposphere), (*Radio waves, Propagation), Very high frequency, Radio signals, Video signals, Frequency modulation, Graphics, Attenuation, Radio fields, Intensity, Statistical distributions, Statistical functions.

The propagation curves presented are the best systematic estimates of tropospheric propagation which are possible with the meager data presently available, and

the incomplete knowledge of the mechanism of tropospheric propagation and meteorology. The submission of generalized curves is only justified by the immediate practical need of providing a basis for Television and FM allocations which recognizes the existence of tropospheric propagation, instead of ignoring the tremendous departures from the values calculated assuming a standard atmosphere.

PB-166 710 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Information Div.
COMBINATION OF SEVERAL INTERFERING SIGNALS IN THE VHF RANGE,
by Harry Fine. 31 Aug 49, 12p
Rept. nos. TID-4.2.3, 55112
Unclassified report

Reference J to the rept. of the Ad Hoc Committee for the evaluation of the radio propagation factors concerning the television and frequency modulation broadcasting services in the frequency range between 50 and 250 mc.

Descriptors: (*Radio interference, Very high frequency), Radio signals, Radio fields, Intensity, Statistical distributions, Graphics.

Simple formulas are given for rapidly calculating the combined distributions for several interfering signals.

PB-166 711 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Information Div.
THE NORMAL DISTRIBUTION AS APPLIED TO VHF BROADCAST SERVICE PROBLEMS,
by Harry Fine. 26 May 49, 22p
Rept. nos. TID-4.2.2, 36707
Unclassified report

Reference F to the rept. of the Ad Hoc Committee for the evaluation of the radio propagation factors concerning the television and frequency modulation broadcasting services in the frequency range between 50 and 250 mc.

Descriptors: (*Propagation, Statistical distributions), (*Statistical distributions, Propagation), (*Radio signals, Propagation), Numerical analysis, Radio fields, Intensity, Very high frequency, Terrain, Radio interference.

Normal distributions are encountered very frequently in physical statistics. A pertinent example of this type of distribution is the variation both in time and in space of electromagnetic field intensities in the VHF frequency range. This paper derives useful formulae and several approximations for specific application to VHF propagation problems.

PB-166 712 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
AN ABBREVIATED METHOD FOR CALCULATING MULTIPLE INTERFERENCE.
27 Feb 50, 10p TRR-4.2.4 Unclassified report

Descriptors: (*Radio interference, Very high frequency), (*Numerical analysis, Radio interference), Radio signals, Radio communication systems, Television communication systems.

This paper presents an approximate solution for combining radio and television interference from several sources in the VHF band. The proposed method may not be quite as accurate an approximation as other methods but is much more practical from the standpoint of ease in application.

PB-166 714 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
A SUMMARY OF THE TECHNICAL FACTORS AFFECTING THE ALLOCATION OF LAND MOBILE FACILITIES IN THE 152 TO 158 MEGACYCLE BAND. Revised edition,
by William C. Boese. 12 Aug 54, 14p
Rept. nos. TRR-4.3.8, 92481
Unclassified report

Revision of report dated 3 Jan 51.

Descriptors: (*Radio waves, Propagation), Very high frequency, Radio transmission, Mobile, Radio equipment, Radiofrequency interference, Signal-to-noise ratio, Measurement, Site selection.

The object of this study is to consolidate the available information on equipment performance, wave propagation, and procedures for the calculation of service and interference for the purpose of setting forth a systematic basis for evaluating the technical factors involved in the allocation of land mobile facilities, particularly of the Miscellaneous Common Carrier Service, in the 152 to 158 megacycle band. Recommendations are submitted for representing service areas, taking account of receiver performance, external noise, and interfering signals from other stations on the same channel.

PB-166 715 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
POTENTIAL INTERFERENCE FROM OPERATIONAL FIXED STATIONS ON 72-76 MC TO TELEVISION CHANNELS 4 AND 5,
by Arnold G. Skrivseth, Harry Fine, and William C. Boese. 25 Aug 52, 22p Rept. nos. TRR-5.3.5, 80030
Unclassified report

Descriptors: (*Television stations, Radio interference), (*Radio interference, Television stations), (*Video signals, Radio interference), Very high frequency, Propagation, Radio waves, Numerical analysis, Intensity, Polarization, Distribution, Television receivers.

The percentage of potential receiver locations which would be interfered with under certain conditions is computed. It is shown that for a television station of 100 kw effective radiated power and an antenna height above average terrain of 500 feet in a full lattice of co-channel TV stations versus a fixed station of 100 watts at 100 feet above average terrain that a separation of approximately 45 miles between the two stations results in the greatest extent of interference to television. Finally, a set of curves is derived based on algebraic approximations of the propagation curves, such that a

radius can be determined where 10 percent of the potential locations which would otherwise receive service would lose that service due to interference from the operation of a 72-76 mc station.

PB-166 716 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
POTENTIAL INTERFERENCE FROM OPERATIONAL FIXED STATIONS ON 72-76 MC TO TELEVISION CHANNELS 4 AND 5,
by Arnold G. Skrivseth, Herman Garlan, and Harry Fine. 11 Dec 53, 8p Rept. nos. TRR-5.3.6, 99287
Unclassified report

Descriptors: (*Television stations, Radio interference), (*Radio interference, Television stations), (*Video signals, Radio interference), Very high frequency, Propagation, Radio waves, Numerical analysis, Intensity, Polarization, Distribution, Television receivers.

In a previous report on the same subject (T. R. R. Report No. 5.3.5.) certain assumptions were made concerning the variables involved in this problem. The same assumptions are retained herein with the exception that the receiver rejection ratio is that obtained from the proposal of the R.T.M.A. for 50% of the receivers tested in their submission in Docket No. 10315. This ratio is variable with frequency and with field intensity of the TV signal. This results in new charts for computation of the radius where 10 percent of the potential locations which would otherwise receive service would lose that service due to interference from the operation of a 72-76 mc. station. (Author)

PB-166 717 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
PRESENT KNOWLEDGE OF PROPAGATION IN THE VHF AND UHF TV BANDS.
Revised ed.
by William C. Boese and Harry Fine. 15 Nov 55, 15p Rept. no. TRR-2.4.15
Unclassified report

Revision of report dated October 7, 1955.

Descriptors: (*Propagation, Video signals), (*Video signals, Propagation), (*Radio waves, Propagation), Very high frequency, Ultrahigh frequency, Measurement, Television stations, Distribution, Radio interference, Television communication systems.

This report reviews recent measurements and their analysis as they may affect the service and interference of TV broadcast stations.

PB-166 718 Div. 8
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
SUPPRESSION PERFORMANCE OF DIRECTIONAL ANTENNA SYSTEMS IN THE STANDARD BROADCAST BAND,
by Harry Fine and Jack Damelin. 6 Sep 57, 40p Rept. nos. TRR-1.2.7, 49526 Unclassified report

Descriptors: (*Antennas, Performance (Engineering)), Antenna radiation patterns, Radio waves, Ionospheric propagation, Radio fields, Scattering, Medium frequency.

The suppression performance of directional antenna systems in the standard broadcast band is studied both near-in to the arrays and at the greater distances in the range of the skywave fields. In both cases, it is found that the measured fields are greater than the theoretically calculated fields, assuming perfectly conducting smooth earth, the departures increasing with the theoretical suppression and being much more substantial for the skywave fields. Methods are developed to estimate the average and maximum effective radiated fields expected in these suppression directions. In addition, based on the form of these estimates, the probable nature of the physical mechanisms, which cause these departures from theory, is discussed. For the close-in fields, the departures are probably caused by radiation from large objects and reflection from gross irregularities of the terrain in all azimuthal directions, whereas for the skywave fields - these departures are most likely caused by incoherence in the fields from the individual elements of the array, introduced by scattering from terrain and ionospheric irregularities.

PB-166 720 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
POLARIZATION DISCRIMINATION IN TELEVISION BROADCASTING,
by Julian T. Dixon and John M. Taff. 14 Mar 58, 18p Rept. nos. TRR-4.3.10, 56610
Unclassified report

Descriptors: (*Video signals, Radiofrequency interference), (*Wave transmission, Polarization), Television antennas, Propagation, Television stations.

This study considers the possibility of reducing television co-channel and adjacent channel interference through the device of having alternately spaced stations transmit with vertical polarization and horizontal polarization, respectively. Unfortunately, practical antenna systems and propagation under practical conditions produce some cross polarization; that is, transmissions intended to be received on one type of antenna can in fact be received on the oppositely polarized antenna. This paper reviews the presently available data and indicates what results may be expected.

PB-166 721 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
A PRELIMINARY ANALYSIS OF MULTICASTING,
by E. W. Allen, Harry Fine, and Jack Damelin.
4 Feb 58, 9p Rept. nos. TRR-5.1.1, 55232
Unclassified report

Descriptors: (*Video signals, Wave transmission), (*Wave transmission, Video signals), Ultrahigh frequency, Television transmitters, Statistical functions, Electromagnetic fields, Intensity, Distribution, Effectiveness.

Experience within the last few years with the difficulties encountered in providing UHF television broadcast service in rough terrain from a single transmitter have led to investigation of possible new approaches to

the provision of this service. A study is made to evaluate the advantages of multicasting which is the technique of providing a single service to an area by means of several transmitters on different frequencies and at different locations.

PB-166 722 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
ANTENNAS FOR STANDARD BROADCAST STATION RECEPTION.
1 Apr 58, 17p Rept. no. TRR-9.2.1
Unclassified report

Rept. includes Memorandum on the Beverage Wave Antenna for Reception of Frequencies in the 550-1500 Kilocycle Band, by Benjamin Wolf and Adolph Andersen.

Descriptors: (*Antennas, Medium frequency), Gain, Radio interference, Transmission lines, Radio communication systems, Civil defense systems, Radio receivers, Impedance matching, Coupling circuits.

This document describes various types of antennas and auxiliary equipment that may improve reception in fringe areas or may reduce co-channel or adjacent channel interference.

PB-166 723 Div. 8, 30
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
FIELD STRENGTH MEASUREMENTS,
by E. W. Chapin. 1 Oct 58, 22p
Rept. nos. LD-6.3.1, 67334
Unclassified report

Descriptors: (*Radio fields, Measuring devices (Electrical and electronic)), (*Measuring devices (Electrical and electronic), Radio Fields), Antennas, Measurement, Polarization, Field emission, Attenuators, Power supplies, Radio signals, Noise (Radio), Electric Fields, Magnetic Fields.

An attempt has been made to make this paper useful both to those designing and maintaining field strength equipment as well as those engaged in field strength measurements. In order to avoid an unwieldy product, an attempt is made to treat the usual problems rather than to dwell too much on exceptional applications. Furthermore, it is assumed that an accuracy of approximately 1 db is the maximum accuracy desired. This permits the neglect of many second order effects which otherwise would require encumbering qualifications in many places in this report.

PB-166 724 Div. 8, 5
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C. Office of the Chief Engineer.
REPORT ON THE ANALYSIS OF MEASUREMENTS AND OBSERVATIONS, NEW YORK CITY UHF-TV PROJECT,
by George V. Waldo. 27 Mar 63, 38p
Rept. no. R-6303
Unclassified report

Prepared for presentation at the IEEE International Convention, New York, 25-28 Mar 63.

Descriptors: (*Television stations, New York), (*Video signals, Propagation), Antenna radiation patterns, Radio fields, Radiofrequency power, Intensity, Television receivers, Images, Visibility, Very high frequency, Ultrahigh frequency.

Field strength measurements and picture observations were taken by specially trained crews at about 3900 randomly selected locations. This survey provided a significant sample for the area served by Empire State Building TV facilities out to a radius of 25 miles. The survey included complete measurements of Channels 2, 7 and 31, and information was developed on the availability and extent of TV service for low- and high-VHF channels as well as for UHF.

PB-166 725 Div. 8, 5
CFSTI Prices: HC$4.00 MF$0.75

Federal Communications Commission, Washington, D. C. Office of the Chief Engineer.
REPORT ON MOBILE FIELD STRENGTH MEASUREMENTS, NEW YORK CITY UHF-TV PROJECT,
by Daniel B. Hutton. 12 Feb 63, 102p
Rept. no. R-6302
Unclassified report

Descriptors: (*Video signals, Propagation), (*Television stations, New York), Radiofrequency power, Very high frequency, Ultrahigh frequency, Radio fields, Intensity, Measurement, Mobile, Monitors.

This report concerns the mobile field strength measurements portion of the New York City UHF-TV Project. Measurements were made on Channels 2, 7 and 31 to compare the relative effectiveness of low VHF, and UHF television broadcasts from the Empire State Building. Incidental measurements were made on Channel 77 to find the extent of coverage of a translator station on the George Washington Bridge. Measurements were made on 8 radials and two circular arcs centered upon the Empire State Building. In general, it was found that television signal strength drops faster with distance on UHF than it does on VHF, but where the signals are weak UHF is less subject to man-made noise than VHF. High VHF signal variations resemble UHF variations more than they do low VHF variations. Overall indications from the radial measurements are that the difference between winter and summer propagation of television signals on either VHF or UHF on the average amounts to less than ± 1 dB. (Author)

PB-166 726 Div. 8, 2
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Research Div.
VARIATIONS OF VHF FIELD STRENGTHS OVER A SUNSPOT CYCLE (1950-1961),
by Jack Damelin. 3 Jan 63, 14p
Report nos. R-6301, 29294
Unclassified report

Descriptors: (*Sunspots, Radiofrequency interference), (*Radio waves, Propagation), Very high frequency, Radio transmission, Radiofrequency power, Attenuation, Measurement, Radio equipment, Washington (State), Oregon, Experimental data, Graphics.

This report presents the results of long term field strength measurements taken on Station KING-FM, 98.1 megacycles, Seattle, Washington, with the receiving installation located at the Commission's monitoring station at Portland, Oregon, involving a beyond line of sight transmission path of 144.6 miles. The main objective

of this project was to study long term annual variation of field strengths over the 11 year/sunspot cycle. A large amount of data were obtained over most of the 11 year period, commencing with September 1950 and running through August 1961. During this period station KING-FM operated with an effective radiated power of 15 kilowatts, and a transmitting antenna height of 410 feet above average terrain. The receiver used was a modified military surplus type BC-624 coupled to an Esterline-Angus graphical recorder. Based on the data developed, there appears to exist no general long term relationship between FM band field strengths and annual sunspot numbers.

PB-166 727 Div. 8, 5
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C. Office of the Chief Engineer.
REPORT ON RECEIVER INSTALLATIONS, NEW YORK CITY UHF-TV PROJECT,
by Jules Deitz. 14 Nov 62, 30p Rept. no. R-6201
Unclassified report

Descriptors: (*Video signals, Propagation), (*Television receivers, Signal-to-noise ratio), Radio transmission, Radiofrequency interference, Ultrahigh frequency, Very high frequency, Antenna radiation patterns, Radiofrequency power, Measurement, New York.

The report deals with the installation of observation receivers at 768 randomly selected locations within 25 miles of the Empire State Building. All of the television signals observed originated at this site. The data shows that on the basis of percentage of locations receiving 'Excellent' or 'Fine' (Grade 1 or 2) pictures indoors or 'Excellent', 'Fine' or 'Passable' (Grade 1, 2 or 3) pictures indoors, Channel 31 was inferior to Channels 2 and 7 by approximately 10%. This was primarily due to thermal noise caused by lower penetration of UHF signals. This difference almost disappears completely when outside antennas are employed. The simplest of antennas are usually satisfactory for the reception of either UHF or VHF. Good reception was obtained at most locations using a single antenna for both UHF and VHF. Color reception is favored neither by UHF or VHF. Ghosting differences between UHF and VHF are small enough to be disregarded. Householder's ratings are subject to question. Better shielding against IF pickup and some accomodation for coaxial transmission lines will assist the installer in providing better reception at difficult locations.

PB-166 728 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Lab. Div.
SOME CHARACTERISTICS OF TELEVISION RECEIVERS MANUFACTURED IN THE U. S. A. IN 1961.
19 Oct 62, 8p Rept. no. L-6201
Unclassified report

Descriptors: (*Television receivers, Performance (Engineering)), Noise (Radio), Images, Modulation, Radiofrequency interference, Oscillators, Video signals, Cathode ray tubes, Circuits.

Television receivers from 10 manufacturers were examined in connection with the New York UHF Television Project. Each receiver provided monochrome reception on all VHF and UHF channels and was considered by the manufacturer to have the highest overall performance of the models offered by his company. Characteristics examined were: noise figure, selectivity, image ratio, intermodulation interference, oscillator frequency drift, oscillator radiation, sweep circuit interference, and VSWR interference. Results are given in tabular form.

PB-166 732 Div. 8
CFSTI Prices: HC$3.00 MF$0.75

Federal Communications Commission, Washington, D. C. Technical Research Div.
A FURTHER ANALYSIS OF TASO PANEL 6 DATA ON SIGNAL TO INTERFERENCE RATIOS AND THEIR APPLICATION TO DESCRIPTION OF TELEVISION SERVICE,
by Harry Fine. 1 Apr 60, 55p
Rept. nos. TRR-5.1.2, 92022
Unclassified report

Descriptors: (*Video signals, Radiofrequency interference), Data, Statistical distributions, Performance (Engineering), Analysis, Graphics.

A more precise interpretation of the TASO Panel 6 (Panel on 'levels of picture quality' of the Television Allocations Study Organization, Jan. 1959) signal to interference ratio data is developed. By transformation to a new quality index M, the viewer reaction to any given type of interference can be described as a continuous variable having a basic normal distribution. Further, a simple linear relationship has been developed between the average quality index M and the signal to interference ratio R. The above relationships are combined with the known variability of TV signals, both with time and from location to location, to provide useful analytic relationships which permit a fairly complete prediction of TV service. (Author)

PB-166 733 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
AN EFFECTIVE GROUND CONDUCTIVITY MAP FOR CONTINENTAL UNITED STATES,
by Harry Fine. 1 Jun 53, 6p
Rept. nos. TRR-2.1.4, rev., 92766
Unclassified report

Descriptors: (*Maps, Propagation), (*Propagation, Radio waves), United States, Electrical conductance, Soils, Intensity, Radio fields.

A new effective ground conductivity map for continental United States is submitted in this report. This map represents estimates based on measurements over approximately 7,000 paths throughout the country which were submitted to the F.C.C. The conductivity over a given path may vary over wide limits with location, season, weather, etc. Consequently, the effective conductivity, as used here, is defined as that value of conductivity which will result in the overall median field intensity for the path or segment of path under consideration when used in conjunction with the Commission's ground wave field intensity versus distance curves.

PB-166 734 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Research Div.
TECHNICAL FACTORS AFFECTING THE ASSIGNMENT OF FACILITIES IN THE DOMESTIC PUBLC LAND

MOBILE RADIO SERVICE,
by Roger B. Carey. 24 Jun 64, 13p Report no. R-6406
Unclassified report

Descriptors: (*Radio waves, Propagation), (*Radio communication systems, Mobile), Radio transmission, Low frequency, Very high frequency, Ultrahigh frequency, Radiofrequency power, Antenna radiation patterns, Signal-to-noise ratio, Radio equipment.

The Domestic Public Land Mobile Radio Service treated in this report is the two-way service with mobile units, employing separate frequencies for the base station and the mobile transmitters. Although the system parameters in both directions are important from an operational standpoint, only the reception of a base station by a mobile unit is considered, since this is the controlling factor for assignment purposes. The one-way signalling or paging service requires somewhat different parameters because of reduced receiving sensitivity and different modulation techniques and should be given separate consideration.

PB-166 735 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Div.
FIELD MEASUREMENTS OF ELECTROMAGNETIC ENERGY RADIATED BY RF STABILIZED ARC WELDERS,
by Herman Garlan, L. Glen Whipple, and Irving L. Weston. 10 Feb 64, 24p Rept. no. T-6401
Unclassified report

Descriptors: (*Arc welding, Radiofrequency interference), (*Radiofrequency interference, Arc welding), (*Electromagnetic fields, Measurement), Propagation, Electromagnetic shielding, Ground (Electrical), Attenuation, Electric arcs, Radiofrequency, Stabilization.

This report presents the results of field strength measurements made on 152 RF welders in commercial installations in the United States. The data emphasizes the importance of a good low-impedance ground and good shielding in reducing radiation. An empirical formula for attenuation of field with distance is obtained which may be used to extrapolate the radiated field from an RF welder measured with quasi-peak detection at distances between 100 and 2,000 feet. On the basis of this formula, three-fifths of the measured installations radiated less than 15 microvolts per meter at 1,000 feet. (Author)

PB-166 736 Div. 8, 5
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C. Office of the Chief Engineer.
REPORT ON MOBILE FIELD STRENGTH MEASUREMENTS TAKEN WITH RECEIVING ANTENNA 10 FEET ABOVE GROUND, NEW YORK CITY UHF-TV PROJECT,
by Daniel B. Hutton. 5 Jun 64, 32p Rept. no. R-6405
Unclassified report

Descriptors: (*Video signals, Propagation), (*Antenna radiation patterns, Video signals), (*Television stations, New York), Ultrahigh frequency, Radio transmission, Radiofrequency power, Radio fields, Intensity, Measurement, Mobile, Monitors, Antennas.

Most of the measurements were taken while only the horn transmitting antenna was in use on the Empire State Building. The other measurements were taken after the main transmitting antenna was in use. Circularly and horizontally polarized waves were radiated alternately, at half hour intervals, from the horn antenna. Horizontal polarization only was radiated from the main antenna. Mobile field strength measurements were made with antennas 10 feet above ground on one radial and two circular arcs. In general it was found that gross variations in field strength showed some correlation with the terrain over the propagation path. Circular and horizontal polarization measurements were so nearly alike that neither appeared to have the advantage. Based upon transmitter antenna radiation patterns provided by the manufacturer and upon effective radiated powers adjusted to equal values, main antenna exceeded horn antenna field strengths more with greater distance. The differences were partly due to the 320 foot greater height of the main antenna leaving a remainder which may be due to the power adjustments that were made in compensating for the deep minimum of the main antenna vertical pattern near the horizontal.

PB-166 737 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Research Div.
THE NEED FOR COMPATIBILITY STUDIES AT VHF AND UHF,
by Elton D. Davis. 29 Apr 64, 9p
Report no. R-6403
Unclassified report

Descriptors: (*Radiofrequency interference, Data processing systems), (*Radio waves, Propagation), (*Communication systems, Compatibility), Ultrahigh frequency, Very high frequency, Radio transmission, Terrain, Attenuation, Simulation, Digital computers, Interference analyzers.

The Federal Communications Commission is presently implementing a procedure for preparing interference studies by computer at standard broadcast frequencies. The Electronic Compatibility Analysis Center (ECAC) at Annapolis has demonstrated at least a limited capability for making compatibility analysis studies on frequencies above 100 megacycles per/second using a digital computer. This report considers the value and the problems involved in implementing a capability for making compatibility and interference studies using data processing techniques and digitized terrain data in the VHF and UHF range at the FCC.

PB-166 738 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Research Div.
A STUDY OF THE TECHNICAL FACTORS PERTAINING TO THE ASSIGNMENT OF FM CATV MICROWAVE RELAYS,
by E. W. Allen and H. Fine. 30 Dec 64, 13p Report no. R-6408
Unclassified report

Descriptors: (*Microwave relay systems, Frequency modulation), (*Video signals, Microwave relay systems), (*Frequency modulation, Microwave relay systems), Radio transmission, Very high frequency, Sidebands, Communication theory.

This report is an evaluation of the technical factors involved in the assignment of FM CATV relay systems in the 250 Mc/s within the band 12.700 to 12.950 Gc/s. It is expected that most of the transmissions in this band will use frequency modulation (FM), toward which this study is directed. Most of the theory and principles

developed here should apply to other FM relay systems. This study indicates that from a theoretical point of view it may be desirable to use relatively large index FM with overlapping higher order sidebands on adjacent channel operation. Laboratory and field measurements are needed to evaluate the extend to which this concept of interleaving can be used.

PB-166 739 Div. 8
CFSTI Prices: HC$2.00 MF$0.50

Federal Communications Commission, Washington, D. C. Research Div.
FIELD CALIBRATION OF MODERATE GAIN UHF-TV RECEIVING ANTENNAS FOR FIELD STRENGTH MEASUREMENT PURPOSES,
by Roger B. Carey. 26 Feb 64, 31p
Report no. R-6402

Unclassified report

Descriptors: (*Television antennas, Calibration), Gain, Ultrahigh frequency, Radio fields, Intensity, Measurement, Television receivers, Mobile, Antenna radiation patterns.

This report concerns the field calibration of moderate gain UHF-TV receiving antennas for use in mobile field strength measurement programs. The criteria for selection of suitable calibration sites and calibration techniques are discussed. The field results are analyzed and compared with laboratory calibrations and manufacturers' data for the same antennas.

PB-166 740 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Research Div.
ANALYSIS OF SWEEP FREQUENCY SPECTRUM OCCUPANCY ANALYZER,
by Harry Fine. 21 Jan 64, 13p
Report no. R-6401

Unclassified report

Descriptors: (*Radiofrequency spectroscopy, Spectrum analyzers), (*Spectrum analyzers, Radiofrequency spectroscopy), Radiofrequency, Scheduling, Statistical analysis.

The theory and analysis of the sweep frequency spectrum occupancy analyzer are developed in order to assist in both the design and the product analysis of the sweep frequency spectrum occupancy analyzer. It is shown that the analysis is more accurate and appreciably simplified when the system is designed so that the channel scanning time is much smaller than the channel average message duration which in turn, is much smaller than the total sweep time.

PB-166 741 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Research Div.
A METHOD OF ESTIMATING THE EXTENT OF INTERFERENCE TO TV BROADCAST SERVICE CAUSED BY LOW-POWER TRANSMITTERS OPERATING ON VHF TV CHANNELS,
by George V. Waldo and William A. Daniel. 31 Dec 63, 17p Report no. R-6306

Unclassified report

Descriptors: (*Video signals, Radiofrequency interference), (*Radiofrequency interference, Video signals), Very high frequency, Radio transmitters, Mobile, Antennas, Polarization, Graphics, Radiofrequency power, Television receivers.

This report presents a set of curves developed for estimating interference potentialities under average conditions. If these curves were to be applied for a specific case, departures from average conditions must be considered and allowances made as appropriate for such departures. Since the information developed in this report applies to average conditions, it must be emphasized that more stringent limitations may be required to avoid interference where propagation conditions differ from those described in this report, or where transmitters or receivers have characteristics unlike those assumed. For example, the curves in this report are based on noticeable interference being caused, on the average, to 50% of the TV receivers located at given distances from mobile transmitters. If 90% of the TV receivers were to be protected against interference at a given distance from mobile transmitters, the power of these transmitters would have to be decreased by about 14 dB from that indicated by the curves in this report.

PB-166 742 Div. 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Research Div.
COMPARATIVE FIELD STRENGTH MEASUREMENTS IN THE HIGH AND LOW VHF BANDS,
by Jack Damelin. 6 Dec 63, 14p
Report no. R-6305, 44063

Unclassified report

Descriptors: (*Video signals, Propagation), (*Radio waves, Propagation), Television stations, Very high frequency, Radio fields, Intensity, Terrain, Attenuation, Measurement, Monitors.

This report presents the results of long term comparative field strength measurements in the Low and High VHF bands employed for television broadcasting. Two different types of paths were selected for these measurements. One was a clear, line-of-sight path over relatively smooth terrain, and the other was severely obstructed by a mountain range. Stations KRIS-TV and KZTV, channels 6 and 10 respectively, of Corpus Christi, Texas, were recorded at the Commission's Kingsville, Texas monitoring station; stations KPIX-TV and KGO-TV, channels 5 and 10 respectively, of San Francisco, California were measured at the Commission's Livermore, California monitoring installation. The primary purpose of these measurements was to provide information on propagation differences, if any, on Low and High VHF channels under most comparable conditions as will be described subsequently in greater detail.

PB-166 749 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Navy Dept., Washington, D. C.
PREAMPLIFIER, HEWLETT-PACKARD, 152A, 152B, AM-3015/USM-137.
Instrument Calibration Procedure Technical Manual.
1 Oct 64, 16p NAVWEPS 17-20AA-33

Unclassified report

Descriptors: (*Instruction manuals, Calibration), (*Calibration, Preamplifiers), (*Preamplifiers, Calibration), Test sets, Test equipment (Electronics), Test methods.

This manual describes the calibration of the Hewlett-Packard 152A or 152B, or AM-3015/USM-137 preampli-

fier which is a plug-in, wide-band, dual-channel, high-gain preamplifier used with the Hewlett-Packard 150A oscilloscope. It provides calibrated step attenuation, vertical positioning controls, and either d-c or a-c coupling for either of two inputs.

REIC-36 Div. 8, 20
CFSTI Prices: HC$6.00 MF$1.50

Radiation Effects Information Center, Columbus, Ohio.
THE EFFECT OF NUCLEAR RADIATION ON ELECTRONIC COMPONENTS, INCLUDING SEMICONDUCTORS,
by R. K. Thatcher, D. J. Hamman, W. E. Chapin, C. L. Hanks, and E. N. Wyler. 1 Oct 64, 232p
Contract AF33(615)-1124
Unclassified report

Descriptors: (*Electronic equipment, Radiation damage), (*Semiconductors, Radiation damage).

SC-TM-64-541 Div. 8
CFSTI Prices: HC$3.00 MF$0.75

Sandia Lab., Albuquerque, N. Mex.
OPERATION MANUAL FOR FIELD FREQUENCY GENERATOR,
by H. W. Loemker. Oct 64, 52p
Contract AT(29-1)-789
Unclassified report

Descriptors: (*Electronic equipment, Instruction manuals).

SC-TM-64-1763 Div. 8
CFSTI Prices: HC$1.00 MF$0.50

Sandia Lab., Albuquerque, N. Mex.
ELEMENTS AND SYSTEMS OF TRANSIENT WAVEFORM RECORDING,
by J. B. Szymanski. Dec 64, 20p
Contract AT(29-1)-789
Unclassified report

Descriptors: (*Transients, Instrumentation), (*Instrumentation, Recording systems).

UCRL-12040 Div. 8, 15
CFSTI Prices: HC$3.00

Lawrence Radiation Lab., Univ. of California, Livermore.
RELIABILITY AND FAILURE OF ELECTRONIC EQUIPMENT, SYSTEMS, AND MATHEMATICAL MODELS: A BIBLIOGRAPHY,
by Carlotta M. Vidoni. Oct 64, 60p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Reliability (Electronics), Bibliographies), (*Mathematical models, Reliability).

9. Fluid Mechanics

LA-3177-MS Div. 9
CFSTI Prices: HC$1.00

Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE INTEGRATED PRESSURE DROP IN TWO-PHASE, NONADIABATIC FLOW OF HYDROGEN,
by John R. Bartlit. 4 Jul 64, 12p
Contract W-7405-eng-36
Unclassified report

Descriptors: (*Hydrogen, Gas flow), (*Gas flow, Hydrogen).

WAPD-T-1636 Div. 9
CFSTI Prices: HC$2.00 MF$0.50

Bettis Atomic Power Lab., Pittsburgh, Pa.
THE LIMIT PRESSURE OF RADIAL NOZZLES IN SPHERICAL SHELLS,
by R. L. Cloud. Nov 64, 34p CONF-763-43
Contract AT-11-1-GEN-14
Unclassified report

American Society of Mechanical Engineers Winter Meeting, New York, Nov-Dec 64.

Descriptors: (*Nozzles, Pressure).

10. Fuels and Combustion

Patent 3,165,060 Div. 10, 27

MULTIPLE PROPELLENT GRAIN FOR ROCKET MOTORS.
Patent assigned to Air Force,
by James V. Braun and Willard S. Bacon. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Rocket propellant grains), (*Rocket propellant grains, Patents), Solid rocket propellants, Cylindrical bodies, Burning rate, Design.

The rocket motor charge is composed of a plurality of propellants of prescribed and graduated burning rates, advantageous contours and dimensions such that the burning of all of the propellants in a grain ends at the same time. This result is accomplished by designing the propellants as long cone structures with sharp edges and points and with mathematically determined inclinations and proportionate dimensions that collectively provide a materially improved volumetric burning efficiency, high mass ratio, low center of gravity travel and that eliminates previously encountered difficulties in burning high-burning-rate propellants.

PB-166 406 Div. 10, 4
CFSTI Prices: HC$5.00 MF$1.25

General Electric Co., Schenectady, N. Y.
A STUDY OF CORONA PROCESSING OF COAL.
Research and development rept. for Mar 62-Sep 64,
by N. R. Dibelius, J. A. Coffman, M. Kawahata, and S. J. Lawrence. Sep 64, 200p
Contract 14 01 0001 237
OCR RDR7
Unclassified report

Descriptors: (*Coal, Electrical corona), (*Electrical corona, Coal), (*Fuels, Liquids), Chemical reactions, Methane, Tar, Powders, Hydrogen, Slurry fuels.

The first step was to adapt corona technology, which had been principally concerned in a negative way with electrical insulation deterioration, into a positive tool for coal conversion. Reactors were devised in which soft, steady corona could be sustained in the presence of coal or coal tar. Experimental work on coal itself began with a corona reactor, packed with powdered bituminous coal, through which a slow stream of hydrogen was passed. Results were encouraging, in that the products were all low molecular weight, not tarry, but as the reaction proceeded, the coal became conductive and snuffed out the corona. Fluidized bed procedures provided no solution. Liquid systems were tried next with the coal in the form of slurries, low temperature tars, or solutions. Again, the penetration of active species was disappointingly small, with reaction being limited primarily to that portion of the material which could be volatilized. The final series of experiments was performed with two stage reactors. Coal was pyrolyzed in a lower zone, and the vapors picked up in a stream of hydrogen or methane and carried up through a corona zone. Conslusions: At the present stage of development and the present market prices for fuel, corona processing is uneconomical as a primary means for converting coal into liquid fuel.

PB-166 744-1 Div. 10, 4, 27
CFSTI Prices: HC$8.10 MF$2.25

General Electric Co., Cincinnati, Ohio.
FREE RADICALS AS HIGH ENERGY PROPELLANTS, PART I,
by E. A. Mickle, W. W. Clauson, and G. C. Szego.
1959, 508p
Contract DA33 008ORD1956
AD 231 222

Unclassified report

Descriptors: (*Rocket propellants, Free radicals), (*Free radicals, Rocket propellants), Rocket propulsion, Atomic energy levels, Chemical equilibrium, Thermodynamics, Rocket motor nozzles, Performance (Engineering), Hydrogen, Fluorine, Nitrogen, Helium, Methane, Oxygen, Liquefied gases, Stability, Ions, Fuel additives.

Hydrogen is the only free radical system possessing sufficient energy storage capability to be useful as a rocket propellant. Metastable states of helium and neon have higher specific energy storage capabilities than the hydrogen free radical and may be more readily stabilized at high concentrations. Cations have high energy storage capability but will be difficult if not impossible to stabilize. Specific impulse of systems of high specific energy content can be maximized by the addition of such diluents as hydrogen and helium. Extensive appendices present tabulations of the equilibrium composition, thermodynamic properties, and nozzle performance parameters of the following systems: H-H2, F-F2-H2, N-N2-He, N-N2-H2, CH4-CH3-H, and various ionic systems.

PB-166 744-2 Div. 10, 4, 27
CFSTI Prices: HC$8.75 MF$2.50

General Electric Co., Cincinnati, Ohio.
FREE RADICALS AS HIGH ENERGY PROPELLANTS, PART II,
by E. A. Mickle, W. W. Clauson, and G. C. Szego.
1959, 573p
Contract DA33 008ORD1956
AD 231 222

Unclassified report

Descriptors: (*Rocket propellants, Free radicals), (*Free radicals, Rocket propellants), Rocket propulsion, Atomic energy levels, Chemical equilibrium, Thermodynamics, Rocket motor nozzles, Performance (Engineering, Hydrogen, Fluorine, Nitrogen, Helium, Methane, Ions, Oxygen, Liquefied gases, Stability, Fuel additives.

A continuation of the appendices of PB-166 744-1.

11. Ground Transportation Equipment

No Entries

12. Guided Missiles

Patent 3,164,992 Div. 12, 27, 30

LIQUID LEVEL INDICATING AND VARYING DEVICE.
Patent assigned to Army,
by William A. Schulze and Herbert W. Fuhrmann.
12 Jan 65

Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Liquid level gages), (*Liquid level gages, Patents), (*Liquid level control, Propellant tanks), Guided missiles, Fuel tanks, Mechanical drawings.

The device is used to indicate and vary the amount of fuel contained in a missile's propellant tank. It enables the required amount of liquid propellant to be maintained in a missile until it is launched. The device is positioned for use in a sealed liquid-containing tank.

SC-DC-64-1433 Div. 12
CFSTI Prices: HC$1.00 MF$0.50

Sandia Corp., Albuquerque, N. Mex.
THERMAL DETECTION METHOD FOR EXTREME ENVIRONMENTS.
Quarterly progress rept. no. 1, 1 Apr-30 Jun 64,
by George Kalon. 30 Jun 64, 20p
Contract AT(29-1)-789

Unclassified report

Subcontracted to Marquardt Corp., Van Nuys, Calif.

Descriptors: (*Spacecraft, Environmental tests), (*Environmental tests, Safety).

13. Installations and Construction

AD-450 071 Div. 13
CFSTI Prices: HC $2.00

Radio Corp. of America, Camden, N. J.

COOLING DEVICES EVALUATION.
Interim development rept. for 24 Jun-24 Sep 64.
24 Sep 64, 31p
Contract NObsr89469

Unclassified report

Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy.

Descriptors: (*Cooling and ventilating equipment, Tests), (*Electric motors, Tests), Blowers, Test equipment, Performance (Engineering), Quality control, Statistical data, Effectiveness.

GEAP-4749 Div. 13, 20
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
HEAT TRANSFER TO SUPERHEATED STEAM. II. IMPROVED PERFORMANCE WITH TURBULENCE PROMOTERS,
by W. A. Sutherland and C. W. Miller. Nov 64, 32p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Steam, Heat transfer), (*Heat exchangers, Performance (Engineering)).

HW-84084 Div. 13, 30
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
RECOMMENDED CHANGES TO THE 234-5 BUILDING ANALYTICAL LABORATORY VENTILATION SYSTEM,
by M. E. Borgeson. 20 Aug 64, 12p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Ventilation, Laboratories).

NAA-SR-Memo-6918 Div. 13, 20
CFSTI Prices: HC$1.00 MF$0.50

Atomics International, Canoga Park, Calif.
PROPOSED TESTS OF A MECHANICAL SEAL FOR POPR COOLANT PUMP,
by R. W. Atz. 14 Dec 61, 9p
Contract AT(11-1)GEN-8

Unclassified report

Descriptors: (*Coolant pumps, Seals (Stoppers)), (*Seals (Stoppers), Test methods), (*Power reactors, Coolant pumps).

NAA-SR-Memo-7429 Div. 13, 20
CFSTI Prices: HC$1.00 MF$0.50

Atomics International, Canoga Park, Calif.
OMRE 40 MICRON FULL FLOW FILTER,
by J. Kajor and R. J. Mack. 31 May 62, 9p
Contract AT-11-1-GEN-8

Unclassified report

Descriptors: (*Liquid filters, Design), (*Reactor coolants, Liquid filters).

UCRL-12180 Div. 13, 14, 22
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
AGGREGATE PRODUCTION WITH NUCLEAR EXPLOSIVES,
by Spenst M. Hansen and John Toman. 20 Nov 64, 34p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Underground explosions, Explosion effects), (*Nuclear explosions, Explosion effects).

UCRL-12248 Div. 13, 20
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
PROGRESS IN NUCLEAR EXCAVATION TECHNOLOGY,
by Milo D. Nordyke and Louis J. Circeo. 12 Dec 64, 28p CONF-650102-1
Contract W-7405-eng-48

Unclassified report

Highway Research Board Annual Meeting (44th), Washington, D. C.

Descriptors: (*Nuclear explosions, Civil engineering), (*Underground explosions, Nuclear explosions).

14. Materials (Non-Metallic)

AD-449 499 Div. 14
CFSTI Prices: HC$3.00

Army Natick Labs, Mass.
DESIGN TABLES FOR COTTON FABRICS: TABLES OF SOLUTIONS OF EQUATIONS FOR COVER FACTOR, BETA FACTOR AND MAXIMUM WEAVABILITY FOR COTTON FABRICS.
Technical rept.,
by Louis I. Weiner and Jesse E. Johnston, Jr.
Aug 64, 161p TSR-128
Proj. 1K024401A113

Unclassified report

Descriptors: (*Cotton textiles, Design), Tables, Equations, Weaving, Textiles, Fibers, Configuration, Programming (Computers), Numerical analysis.

This report contains in tabular form the solutions of the equations for cover factor, beta factor, and maximum weavability for the entire practical range of cotton yarn counts, textures, and basic weave types--including the plain, oxford, 3- and 4-harness twills, and 5-harness sateen. The tables provide immediate solutions to those design parameters that are routinely used by the fabric designer and the textile engineer working on the geometry of textile structures. Included as appendixes are the text of the original report (by Love) which describes the derivation of the maximum weavability equations from Peirce's relationships, and also the computer program that was used for solving these equations for the practical range of textile variables. (Author)

BNL-8711 Div. 14, 20
CFSTI Prices: HC$1.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
A PROGRAM FOR STRENGTH FUNCTION ANALYSIS,
by R. E. Chrien. Dec 64, 7p
Contract AT-30-2-GEN-16 Unclassified report

Descriptors: (*Reactor materials, Tensile properties).

ORNL-3728 Div. 14
CFSTI Prices: HC$3.00

Oak Ridge National Lab., Tenn.
ROOM-TEMPERATURE MECHANICAL PROPERTIES OF EGCR-TYPE AGOT GRAPHITE,
by B. L. Greenstreet, J. E. Smith, F. J. Witt, G. T. Yahr and S. E. Moore. Jan 65, 81p
Contract W-7405-eng-26

Unclassified report

Descriptors: (*Graphite, Mechanical properties).

Patent 3,165,540 Div. 14

PROCESS FOR ISOLATION OF DIVERNOLIN AND TRIVERNOLIN.
Patent assigned to Agriculture,
by Charles F. Krewson and Jesse S. Ard. 12 Jan 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Fatty acid esters), (*Fatty acid esters, Patents), (*Plastics, Preparation), Separation, Vegetable oils, Epoxy plastics, Paints, Ethers, Seeds.

The process is for the isolation of divernolin and trivernolin from a mixture containing epoxyglycerides, other glycerides, and free fatty acids. Source material may be ground Vernonia anthelmintica seed or its seed oil. The products are useful in preparing plastics and paints. Petroleum ether is used in the process.

PB-166 747 Div. 14, 8
CFSTI Prices: HC$3.00 MF$0.50

Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.
INVESTIGATION OF THE SHIELDING PROPERTIES OF CONDUCTING GLASS.
Interim rept. for 26 Jun-26 Sep 52,
by R. F. Schwartz, E. I. Hawthorne, and P. R. Adamson. 26 Sep 52, 52p Research Div. 53-11
Contract AF30 602 279
AD 1299

Unclassified report

Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy.

Descriptors: (*Glass, Electromagnetic shielding), (*Electromagnetic shielding, Glass), Coatings, Electrical conductance, Dielectric properties, Ultrahigh frequency, S band, X band, Mathematical analysis, Attenuation, Thickness.

A theoretical and experimental study of the shielding properties of conductively coated glass is described. Representative types are NESA, Electropane, and E-C glasses. The conductivity of the coating ranges from about 125 ohms per square of area to about 6 ohms per square of area. The theory of this material was developed, and the dependence of its behavior upon the different parameters involved indicated. Theoretically for certain particular multilayer structures, attenuations as high as 42.1 db ad compared with plain glass can be expected, but for non-optimized samples lower values are predicted. Experimentally at X band for existing NESA glass structures as high as 17 db as compared with plain glass were measured. S band and UHF band experiments are described. (Author)

PB-166 750 Div. 14, 8
CFSTI Prices: HC$3.00 MF$0.75

Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.
INVESTIGATION OF THE SHIELDING PROPERTIES OF CONDUCTING GLASS.
Final rept. for 26 Jun 52-17 Oct 53,
by E. I. Hawthorne and D. B. Geselowitz. 17 Oct 53, 56p Research Div. rept. no. 54-10
Contract AF30 602 279
AD 023 015

Unclassified report

Legibility of this document is in part unsatisfactory. Reproduction has been made from the best available copy.

Descriptors: (*Glass, Electromagnetic shielding), (*Electromagnetic shielding, Glass), Coatings, Electric fields, Magnetic fields, Attenuation, Electrical conductance, Frequency, Effectiveness, Configuration, Dielectrics, Theory.

The investigation of the shielding effect of coated glass for the entire project is summarized. Objectives of the project and overall methods of approach are discussed. Idealized theoretical prototype configurations are solved and discussed: a multi-ply structure of alternate, infinite-plane layers of conductors and dielectrics in the path of a normally incident, uniform plane wave for the radiation field; an infinite, infinitely-thin conducting sheet separating two co-axial dipoles, transmitter and receiver, for the induction field, both electric and magnetic. Experimental studies are then discussed. The shielding effect of coated glass as covers for apertures in metallic enclosures was studied. Correlation with theory was determined and a basis for an evaluation of the shielding effectiveness of coated glass under such practical conditions established. Experimental results under induction field conditions with metallic enclosures are presented. (Author)

PB-166 751 Div. 14, 8
CFSTI Prices: HC$1.00 MF$0.50

Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.
INVESTIGATION OF THE SHIELDING PROPERTIES OF CONDUCTING GLASS.
Interim rept. for 26 Dec 52-26 Mar 53,
by D. B. Geselowitz and E. I. Hawthorne. 10 Apr 53, 22p Research Div. 53-31
Contract AF30 602 279
AD 15 032

Unclassified report

Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy.

Descriptors: (*Glass, Electromagnetic shielding), (*Electromagnetic shielding, Glass), Magnetic fields, Resistance (Electrical), Electrical conductance, Coatings, Frequency, Paints, Tests, Theory, Effectiveness, Attenuation.

Shielding of magnetic induction field is considered. A theory for the attenuation offered by an infinite sheet of thin homogeneous conducting material to the axial field of a small loop was developed. Curves of attenuation as a function of frequency, distance, and resistivity was plotted. The theory was extended to include high frequencies up to the radiation field case. Experiments on a 3 foot square sheet of glass coated with a conducting paint of low resistance verified the theory for low frequencies. Tests on the transparent conducting glass samples showed no appreciable attenuation of the magnetic field for frequencies up to 25 megacycles, in agreement with this theory. (Author)

PB-166 752 Div. 14, 8
CFSTI Prices: HC$2.00 MF$0.50

Moore School of Electrical Engineering, Univ. of Pennsylvania, Philadelphia.
INVESTIGATION OF THE SHIELDING PROPERTIES OF CONDUCTING GLASS.
Interim rept. for 26 Mar-26 Jun 53,
by P. N. Carlson, D. B. Geselowitz, and E. I. Hawthorne.
10 Jul 53, 47p Research Div. 54-03
Contract AF30 602 279
AD 16976

Unclassified report

Legibility of this document is in part unsatisfactory. Reproduction has been made from best available copy.
See also PB-166 751.

Descriptors: (*Glass, Electromagnetic shielding), (*Electromagnetic shielding, Glass), Electric fields, Coatings, Frequency, Effectiveness, Theory, Attenuation, Resistance (Electrical).

The report considers primarily the electric induction field shielding. A theory for the attenuation offered by an infinite sheet of thin homogeneous conducting material to an axial field of a small electric dipole source is developed, valid for all surface resistivities and for frequencies up to the radiation field range. Curves of attenuation as a function of frequency, distance, and resistivity are plotted and compared with the previous magnetic shielding curves. The importance of this problem as a prototype for electric induction field shielding studies is discussed. To supplement this theory, experimental tests are outlined, aimed at an evaluation of the shielding possibilities of coated glass and other thin conductive coatings in the presence of electric induction fields. A promising experimental setup was prepared, including calibrated, battery-operated, floating, double-ended receiver and transmitter, to simulate dipole sources and dipole receivers considered in the theory, both for plane sheet tests and for box tests. (Author)

PB-166 755 Div. 14, 26
CFSTI Prices: HC$1.00 MF$0.50

Cincinnati Testing and Research Labs., Ohio.
DEVELOPMENT, EVALUATION AND APPLICATION OF HIGH TEMPERATURE RESISTANT RESIN HAVING HIGH MECHANICAL PROPERTIES.
Rept. for 20 Mar-20 Apr 51,
by Melvin N. Korelitz. Apr 51, 14p Rept. no. 2
Contract W33 038ac21090
ATI 100 695

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Heat-resistant plastics, Laminates), (*Glass textiles, Heat-resistant plastics), Sheets, Panels (Structural), Heat treatment, Aging (Materials), Furnaces, Mechanical properties, Surface properties.

To determine what the effect would be on the finished laminates, if the glass fabric were impregnated uniformly by machine treating rather than by hand, a number of yards of 181-114 fiberglas were treated to various specifications in a Waldron type treater. It was concluded that machine-treating is essential in order to obtain uniformity and also it has made possible the making of larger panels (18' x 18') using the conventional curing cycle. This was not possible with hand-treating without lowering the heat resistance to a great degree. If a lower flow material is to be used, a lower initial resin content is necessary to avoid deteriorated surfaces. This relationship with respect to the size of the part being made will have to be determined.

RFP-490 Div. 14, 20
CFSTI Prices: HC$0.50

Rocky Flats Div., Dow Chemical Co., Golden, Colo.
CERAMICS; RESEARCH AND DEVELOPMENT.
Quarterly progress rept. for Jul-Sep 64,
by D. J. Kessel. 23 Dec 64, 18p
Contract AT(29-1)-1106

Unclassified report

Descriptors: (*Ceramic materials, Scientific research), (*Rare earths, Ceramic materials).

USBM-RC-1119 Div. 14
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Mines, Albany, Oreg. Albany Metallurgy Research Center.
COEFFICIENTS OF THERMAL LINEAR EXPANSION OF FUSED HAFNIUM CARBIDE, CARBON ALLOYS.
Oct 64, 22p
Contract AT(11-1)-599

Unclassified report

Descriptors: (*Hafnium compounds, Carbides), (*Carbon alloys, Thermal expansion), (*Refractory materials, Thermal expansion).

15. Mathematics

AD-287 499 Div. 15, 8, 33
CFSTI Prices: HC$6.00

RAND Corp., Santa Monica, Calif.
FLOWS IN NETWORKS,
by L. R. Ford, Jr. and D. R. Fulkerson. Aug 62,
207p R-375-PR
Contract AF49 638 700 Unclassified report
See also AD-605 014.

Descriptors: (*Networks, Linear programming), (*Linear programming, Networks), (*Transportation, Linear programming), Theorems, Combinatorial analysis, Distribution theory, Traffic, Inequalities, Game theory, Algebraic topology, Communication theory, Statistical analysis.

Problems that can be formulated in terms of linear flows in networks are analyzed. The existence of integral solutions is implied by the assumption of integral data. The max-flow min-cut theorem is employed in the construction of a maximal steady-state flow from one point of a network to another, when each link has an assigned flow capacity. Feasibility theorems are developed for the existence of network flows that satisfy linear inequality constraints. Such theorems are applied to combinatorial problems involving linear graphs, partially ordered sets, set representatives, and matrices of zeros and ones. Efficient methods are presented for constructing flows in capacity-constrained networks that satisfy demands at certain points from supplies at others, to minimize total flow cost. These methods are applied to problems of optimal assignment, shortest chains, warehousing, maximal dynamic flows, critical path scheduling, and project cost curves.

ANL-6952 Div. 15
CFSTI Prices: HC$4.00

Argonne National Lab., Ill.

APPLIED MATHEMATICS DIVISION SUMMARY REPORT, JULY 1, 1963-JUNE 30, 1964.
30 Jun 64, 97p
Contract W-31-109-eng-38

Unclassified report

Descriptors: (*Mathematics, Reviews).

NYO-1480-7 Div. 15
CFSTI Prices: HC$3.00 MF$0.50

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
ASYMPTOTIC EQUIVALENCE OF THE NAVIER-STOKES AND NONLINEAR BOLTZMANN EQUATIONS,
by Harold Grad. 30 Sep 64, 56p MF-41, CONF-640402-1
Contract AT(30-1)-1480

Unclassified report

American Mathematical Society Symposium on Application of Partial Differential Equations in Mathematical Physics, New York.

Descriptors: (*Equations, Nonlinear systems).

PB-166 705 Div. 15
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
ORTHOGONAL LINEAR FORMS IN MULTIVARIATE REGRESSION ANALYSIS,
by Harry Fine. 1 Feb 53, 21p Rept. no. TRR-4.2.5, rev.

Unclassified report

Descriptors: (*Statistical analysis, Theory), (*Curve fitting, Analysis of variance), Matrix algebra, Polynomials, Least squares method, Equations.

A method is developed for the use of orthonormal linear forms in multiple regression analysis. Described in detail are techniques adopted from Hayes and Vickers (Philosophical Magazine, (7) 42,1387) for the solution of the normal equations. These techniques offer the considerable advantages over the standard solutions of being able (a) to select at each stage the variable which makes the maximum contribution to the eventual solution, (b) to decide early in the computations which variables are significant, (c) to permit the deletion of non-significant variables or the addition of new variables (or functions of old ones) without requiring recalculation as would be necessary with standard methods, (d) to give a family of regression curves fitting the data with increasing accuracy so that the regression calculations may be stopped at a stage which has the desired standard error with the minimum number of variables.

PB-166 746 Div. 15, 12
CFSTI Prices: HC$1.00 MF$0.50

RAND Corp., Santa Monica, Calif.
APPROXIMATE CONFIDENCE LIMITS FOR THE RELIABILITY OF SERIES AND PARALLEL SYSTEMS.
Research memo,
by Albert Madansky. 4 Apr 60, 16p RM-2552
Contract AF49 638 700
AD 237 790
Rept. on Proj. RAND. Unclassified report

Descriptors: (*Statistical analysis, Reliability), (*Guided missile components, Reliability), Failure (Mechanics), Statistical distributions, Stochastic processes, Binomials.

Suppose a complex mechanism, e.g., a missile, is built up from a number of different types of components, where the reliability of each of the components has been estimated by means of separate tests on each of the components. This paper gives a method for combining such data to determine approximate confidence limits for the reliability of the complete mechanism. More precisely, a method of determining approximate confidence limits for the reliability of 'series,' 'parallel,' and 'series-parrallel' systems is given, based on observed failures of the individual components. It is assumed that the failures are independent, and that failures of a given component follow a binomial distribution with unknown parameter, the component reliability. The large-sample properties of the likelihood-ratio test are then used to construct the appropriate confidence limits for the system reliability.

UCRL-11855 Div. 15
CFSTI Prices: HC$3.00 MF$0.75

Lawrence Radiation Lab., Univ. of California, Berkeley.
NONLINEAR RESONANCE FOR DUFFING'S DIFFERENTIAL EQUATION.
Thesis,
by Loren P. Meissner. Jan 65, 75p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Differential equations, Resonance).

16. Medical Sciences

BNL-8664 Div. 16
CFSTI Prices: HC$1.00

Brookhaven National Lab., Upton, N. Y.
DOSE CALCULATIONS FOR INTRACRANIAL IRRADIATION WITH THERMAL NEUTRONS,
by J. S. Robertson, D. A. Levine, and L. E. Farr.
1964, 14p CONF-640502-1
Contract AT-30-2-GEN-16

Unclassified report

Prepared in cooperation with M. D. Anderson, Hospital and Tumor Inst., Houston, Tex. Biomathematics Symposium, Houston Tex.

Descriptors: (*Radiobiology, Thermal neutrons).

CONF-640609-1 Div. 16, 20
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
GENERALIZATIONS DERIVED FROM RADIOBIOLOGICAL EXPERIMENTS WITH MAMMALIAN CELLS IN VITRO,
by Paul Todd, Robert Tym, John T. Lyman, and Cornelius A. Tobias. 1964, 21p
Contract W-7405-eng-48

Unclassified report

Society of Nuclear Medicine Annual Meeting (11th), Berkeley, Calif.

Descriptors: (*Radiobiology, Cells (Biology)), (*Cells (Biology), Radiobiology).

HW-83613 Div. 16
CFSTI Prices: HC$2.00

Hanford Atomic Products Operation, Richland, Wash.
PROGRESS IN BIOLOGICAL RESEARCH. A SUMMARY OF HANFORD ACHIEVEMENTS IN THESE PROGRAMS UNDER GENERAL ELECTRIC, 1956-1964.
Nov 64, 43p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Radiobiology, Reviews), (*Health physics, Reviews).

LF-18 Div. 16, 4
CFSTI Prices: HC$0.50

Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
ULTRAMICRO METHODS IN BIOCHEMISTRY.
III. THE DETERMINATION OF SERUM CHOLESTEROL.
IV. THE DETERMINATION OF GLUCOSE,
by E. V. Stewart and B. B. Longwell. Oct 64, 28p
Contract AT(29-2)-1013

Unclassified report

Descriptors: (*Cholesterol, Chemical analysis), (*Glucose, Chemical analysis).

LF-19 Div. 16
CFSTI Prices: HC$0.75

Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
FLORA OF HEALTHY DOGS. III. INCIDENCE AND DISTRIBUTION OF SPIROCHETES IN THE DIGESTIVE TRACT OF DOGS.
Technical progress repts.
by F. F. Pindak, W. E. Clapper, and J. H. Sherrod.
Nov 64, 36p
Contract AT(29-2)1013

Unclassified report

Descriptors: (*Dogs, Bacteria), (*Spirochaeta, Distribution), (*Digestive system, Spirochaeta).

NYO-1242-1 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Massachusetts General Hospital, Boston.
EXTERNAL LOCALIZATION of brain-TUMORS EMPLOYING POSITRON-EMITTING ISOTOPES.
Final rept.
1964, 13p
Contract AT(30-1)-1242

Unclassified report

Descriptors: (*Neoplasms, Tracer studies).

NYO-2567-1 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Wistar Inst. of Anatomy and Biology, Philadelphia, Pa.
FINAL REPORT (ON PROPERTIES OF RNA),
by R. A. Brown. 1964, 4p
Contract AT(30-1)-2567

Unclassified report

Descriptors: (*Ribonucleic acids, Biochemistry).

ORNL-P-745 Div. 16, 20
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
RADIATION DOSE RECEIVED BY PASSENGERS AND CREW ON PLANES CARRYING RADIOISOTOPE SHIPMENTS,
by H. H. Abee and D. M. Davis. 1961, 11p
CONF-803-5
Contract W-7405-eng-26

Unclassified report

International Symposium on the Dosimetry of Irradiations from External Sources, Paris, Nov 64.

Descriptors: (*Radioactive isotopes, Dosage), (*Health physics, Dosage).

ORNL-P-829 Div. 16
CFSTI Prices: HC$2.00 MF$0.50

Oak Ridge National Lab., Tenn.
FINE STRUCTURE OF LAMPBRUSH CHROMOSOMES,
by O. L. Miller, Jr. 1964, 25p CONF-734-4
Contract W-7405-eng-26

Unclassified report

Symposium on Genes and Chromosomes Structure and Function, Buenos Aires, Nov-Dec 64.

Descriptors: (*Chromosomes, Microstructure).

Patent 3,165,537 Div. 16

PREPARATION OF BENZOFURAN DERIVATIVES,
Patent assigned to Agriculture,
by Leonard Jurd. 12 Jan 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25
See also Patent 3,147,280.

Descriptors: (*Patents, Hormones), (*Estrogens, Synthesis (Chemistry)), (*Hormones, Patents), Coumarins, Ketones, O-heterocyclic compounds, Steroids.

The benzofuran derivatives exhibit estrogenic properties and are useful in animal husbandry, particularly as applied to steers which are grown for meat. The benzofuran derivatives are prepared by oxidizing flavylium salts.

PB-166 810 Div. 16, 3
CFSTI Prices: HC$6.00 MF$1.25

Lever Brothers Co., Edgewater, N. J.
BASIC STUDIES IN PERCUTANEOUS ABSORPTION.
Semi-annual rept. no. 4, Jul-Dec 62,
ed. by Leonard J. Vinson, Walter R. Koehler, Marjorie D. Lehman, Thomas Masurat, and Edward J. Singer.
Dec 62, 221p
Contract DA18 108CML6573
AD 298 570

Unclassified report

See also AD-282 258.

Descriptors: (*Skin, Absorption (Biological)), Penetration, Permeability, Electron microscopy, Histological techniques, X-ray diffraction analysis, Infrared spectroscopy, Chemical analysis, Chromatographic analysis,

Membranes (Biology), Water, Water vapor, Oils, Alcohols, Amines, Lipids, Fatty acids, Phospholipids, Humidity, Temperature, Laboratory animals.

The objectives of the skin penetration studies were to determine the fundamental nature of the skin barrietr; to elucidate the principles governing alteration of the penetrability of this barrier; and concurrently to apply the knowledge acquired to the development of optimal materials and techniques for increasing or decreasing the penetration of skin by biologically active materials. The following studies were performed: (1) Comprehensive electron microscopic and light microscopic anatomy of the epidermis, cataloged and annotated, of skin of various areas of the body. (2) Electron microscope and light microscopic including histochemical, studies in all epidermal layers, of carefully graded successive strippings. (3) Microscopic, and biological (or chemical) studies on effects of graded scratching on permeability, with scratching controlled to ± 5 micron increments if possible; other-wise take advantage of random scratching to study effect of these small increments. (4) Anatomical or physico-chemical characterization of the passages which molecules taken en route through the epidermis. (5) Study whether or not the barrier is a biological (living) or chemical-physical phenomenon. (6) Characterization of the energy transfer, if any, involved in penetration.

TID-21440 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Medical Coll. of Virginia, Richmond.
ACUTE BRAIN DAMAGE INDUCED BY X-IRRADIATION. 1. CYTOCHEMICAL AND BUICHEMICAL STUDIES OF NEUROGLIAL NUCLETIC ACIDS.
Final progress rept. for 23 Apr 64-31 Jul 65,
by Robert H. Brownson. 31 Jul 65, 13p
Contract AT(40-1)-2904

Unclassified report

Descriptors: (*Brain, Radiation effects), (*Nucleic acids, Radiobiology).

TID-21445 Div. 16
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania State Univ., University Park.
NUTRITIONAL PHYSIOLOGY OF THE WHITE-TAILED DEER.
Progress rept. for 1964,
by Robert L. Cowan, E. W. Hartsook, and J. S. Lindzey. 1964, 16p
Contract AT(30-1)-3470

Unclassified report

Descriptors: (*Animals, Nutrition), (*Nutrition, Physiology).

UCRL-11786 Div. 16
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
THE KARYOTYPE OF THE DOG (CANIS FAMILIARIS OBTAINED FROM CULTURES OF PERIPHERAL BLOOD LYMPHOCYTES.
Thesis,
by William D. Loughman. Nov 64, 47p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Chromosomes, Dogs), (*Dogs, Chromosomes), (*Lymphocytes, Chromosomes).

17. Metallurgy

BMI-1700 Div. 17
CFSTI Prices: HC$2.00 MF$0.50

Battelle Memorial Inst., Columbus, Ohio.
DEVELOPMENT OF NIOBIUM ALLOYS RESISTANT TO SUPERHEATED STEAM,
by Robert D. Koester, John A. De Mastry, Warren E. Berry, Arthur A. Bauer, and Frank A. Rough.
11 Nov 64, 44p EURAEC-1285
Contract W-7405-eng-92

Unclassified repor

Descriptors: (*Niobium alloys, Corrosion inhibition), (*Corrosion-resistant alloys, Niobium alloys).

BMI-X-322 Div. 17
CFSTI Prices: HC$1.00 MF$0.50

Battelle Memorial Inst., Columbus, Ohio.
THE CORROSION OF NICKEL COMBUSTION REACTORS,
by P. D. Miller, W. N. Stiegelmeyer, and W. K. Boyd.
29 Dec 64, 16p
Contract W-7405-eng-92

Unclassified report

Descriptors: (*Nickel, Corrosion), (*Corrosion, Nickel).

BMI-X-328 Div. 17, 20
CFSTI Prices: HC$1.00 MF$0.50

Battelle Memorial Inst., Columbus, Ohio.
EXPLOSIVE WELDING OF FLAT PLATES OF ZIRCALOY TO INCONEL '600',
by R. J. Carlson, C. C. Simons, and E. G. Smith, Jr.
26 Jan 65, 24p
Contract W-7405-eng-92

Unclassified report

Descriptors: (*Reactor materials, Metallurgy), (*Welding, Metal plates).

DP-860(Vol. II) Div. 17, 20
CFSTI Prices: HC$4.00

Du Pont de Nemours (E. I.) and Co., Inc., Wilmington, Del. Engineering dept.
STAINLESS STEEL INFORMATION MANUAL FOR THE SAVANNAH RIVER PLANT. VOLUME II. FABRICATION,
comp. by W. C. Rion, Jr. Jul 64, 219p
Contract AT(07-2)-1

Unclassified report

Descriptors: (*Reactor materials, Stainless steel), (*Stainless steel, Handbooks).

EURAEC-1213 Div. 17
CFSTI Prices: HC$2.00 MF$0.50

Centre National de la Recherche Scientifique, Paris (France).
CORROSION OF STAINLESS STEELS UNDER STRESS.
Quarterly summary rept. no. 9, 1 Jul-30 Sep 64,
by G. Chaudron. 30 Sep 64, 30p
Contract 085-62-7-RDF

Unclassified report

Descriptors: (*Corrosion, Stainless steel), (*Stainless steel, Corrosion).

EURAEC-1284 Div. 17
CFSTI Prices: HC$2.00 MF$0.75

T. N. O., The Hague (Netherlands).
THE DEVELOPMENT OF A NEW METHOD TO DETERMINE THE BRITTLE-DUCTILE TRANSITION IN STEEL (IN PARTICULAR WITH RESPECT TO EMBRITTLEMENT BY IRRADIATION USING SPECIMENS OF THE ORDER OF 0.15 (cu.cm.).
Rept. for Nov 63-Nov 64,
by H. C. van Elst. 21 Dec 64, 45p
M64-1227-26150
Contract 068-61-11-RDN

Unclassified report

Descriptors: (*Steel, Transformations).

GA-5237 Div. 17, 20
CFSTI Prices: HC$1.00 MF$0.50

General Atomic Div., General Dynamics Corp., San Diego, Calif.
EFFECTS OF IRRADIATION ON A-302B STEEL SUBJECTED TO A MULTIAXIAL STRESS DISTRIBUTION,
by T. A. Trozera and P. W. Flynn. 12 Oct 64,
23p CONF-512-15
Contract AT(04-3)-167

Unclassified report

American Society for Testing and Materials Annual Meeting (67th), Chicago, Jun 64.

Descriptors: (*Steel, Reactor materials), (*Reactor materials, Stresses).

HW-84281 Div. 17, 20
CFSTI Prices: HC$4.00

Hanford Atomic Products Operation, Richland, Wash.
METALLURGY RESEARCH OPERATION.
Quarterly progress rept. for Jul-Sep 64,
15 Sep 64, 51p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Reactor materials, Metallurgy), (*Metallurgy, Reactor materials).

IS-994 Div. 17
CFSTI Prices: HC$4.00

Ames Lab., Iowa State Univ. of Science and Tech.
THE EFFECT OF NITROGEN ON THE STRAIN AGING AND BRITTLE-DUCTILE TRANSITION OF VANADIUM,
by Robert W. Thompson and O. N. Carlson. Aug 64,
105p
Contract W-7405-eng-82

Unclassified report

Descriptors: (*Vanadium, Nitrogen), (*Nitrogen, Vanadium).

LA-3160 Div. 17, 20
CFSTI Prices: HC$1.00

Los Alamos Scientific Lab., Univ. of California, N. Mex.
THE X-RAY FLUORESCENCE SPECTROMETRIC DETERMINATION OF MANGANESE IN URANIUM-PLUTONIUM-MANGANESE ALLOYS,
by E. A. Hakkila, R. G. Hurley, and G. R. Waterbury.
1 Sep 64, 16p
Contract W-7405-eng-36

Unclassified report

Descriptors: (*Manganese alloys, X-ray spectra), (*Reactor fuels, X-ray spectra).

Patent 3,165,427 Div. 17, 8

METHOD OF HEAT TREATING TUNGSTEN WIRE OR RIBBON.
Patent assigned to AEC,
by Edmond C. Hurst. 12 Jan 65

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Heat treatment), (*Heat treatment, Patents), (*Wire, Tungsten), (*Tungsten, Wire), Foils, Vacuum apparatus, Heating elements, Ductility, Electron tube heaters.

The tungsten wire is used as filaments for electronic tubes, electron guns and incandescent lamps. The tungsten wire is placed in an evacuable chamber together with a metal member spatially mounted adjacent to it. The chamber is then evacuated. An A. C. current, applied to the tungsten, and a D. C. voltage applied between the member and the tungsten, are used to heat treat the wire so that it is semiductile after the treatment.

RFP-478 Div. 17
CFSTI Prices: HC$1.00

Rocky Flats Div., Dow Chemical Co., Golden, Colo.
COATING BERYLLIUM WITH ELECTROLESS NICKEL,
by W. H. Roberts. 29 Dec 64, 23p
Contract AT929-1)-1106

Unclassified report

Descriptors: (*Beryllium, Metal coatings), (*Nickel, Metal coatings).

SC-DC-64-1432 Div. 17
CFSTI Prices: HC$3.00 MF$0.75

Sandia Corp., Albuquerque, N. Mex.
BERYLLIUM STUDY PROGRAM.
Quarterly progress rept. no. 3, 1 Apr-30 Jun 64,
by J. L. Blumenthal and Myrrl Santy. 20 Jul 64, 69p
Contract AT(29-1)-789

Unclassified report

Subcontracted to TRW Space Technology Labs., Redondo Beach, Calif.

Descriptors: (*Beryllium, Metallurgy).

UCRL-11067 Div. 17
CFSTI Prices: HC$3.00 MF$0.75

Lawrence Radiation Lab., Univ. of California, Berkeley.
MODERN METALLOGRAPHIC TECHNIQUES,
by G. Thomas. 8 Nov 63, 71p CONF-631102-1
Contract W-7405-eng-48

Unclassified report

Aerospace Materials Conference, Los Angeles.

Descriptors: (*Metallography, Reviews).

18. Military Sciences and Operations

PB-166 683 Div. 18, 32
CFSTI Prices: HC$4.00 MF$1.00

RAND Corp., Santa Monica, Calif.
ECONOMIC REPLACEMENT POLICY,
by Armen A. Alchian. 12 Apr 52, 134p
RAND-R-224
AD 713

Unclassified report

Rept. on Proj. RAND.
Prepared in cooperation with California Univ., Los Angeles.
Legibility of this document is in part unsatisfactory.
Reproduction has been made from best available copy.

Descriptors: (*Replacement theory, Logistics), (*Logistics, Replacement theory), (*Armed forces supplies, Replacement theory), Spare parts, Costs, Mathematical analysis, Decision theory, Optimization, Economics, Tables, Computers.

The rate at which durable equipment is replaced determines, in part, the efficiency and productive capacity of both industrial firms and military organizations. Current replacement practice is guided by various rules of thumb, which are often applied blindly and mechanically to inappropriate situations. This report presents a practical guide for equipment replacement based on the comparison of present value costs. The method involves only simple arithmetic calculations; it is sufficiently general to apply to a wide variety of replacement situations and is sufficiently specific to be useful in practice. The report includes a description of the method, examples of its use, and tables of computing factors to facilitate its application. (Author)

19. Navigation

PB-166 700 Div. 19, 8, 5
CFSTI Prices: HC$1.00 MF$0.50

Federal Communications Commission, Washington, D. C. Technical Research Div.
SYNOPSIS OF RADIO NAVIGATION SYSTEMS,
comp. by Sydney R. Lines. 23 Jun 58,
17p Rept. TRR-8.4.1

Unclassified report

Descriptors: (*Radio navigation, Reviews), (*Navigational aids, Radio equipment), Radar navigation, Radar equipment, Specifications, Electromagnetic waves, Propagation.

INDEX: Marker Beacons, Radar Beacons, Radio Beacons, CONSOL, CYTAC, D/F (Direction Finding), DECCA NAVIGATOR, DECTRA, DELRAC, DME (Distance Measuring Equipment), DOPPLER RADAR, ELECTRA, FAN MARKER, FM RADAR, GCA (Ground Controlled Approach), GEE, GLIDE PATH, ILS (Instrument Landing System), LANAC, LF/MF OMNIRANGE, LOCALIZER, LORAC, LORAN, MOR, NAVAGLOBE, NAVAR, NAVARHO, OBOE, OMNIRANGE, PILOT CABLES, POPI, RACON, RADIO RANGE, RAYDIST, SHORAN, SONNE, TACAN, TCI (Terrain Clearance Instrumentation), TELERAN, VAR, VOR, VORTAC, and Z MARKER.

20. Nuclear Physics and Nuclear Chemistry

ACNP-64030 Div. 20
CFSTI Prices: HC$3.00 MF$0.75

Allis-Chalmers Mfg. Co., Milwaukee, Wis. Atomic Energy Div.
STEAM SEPARATION TECHNOLOGY UNDER THE EURATOM PROGRAM,
Quarterly progress rept. for 1 Oct-Dec 31 64.
11 Jan 65, 62p EURAEC-1286
Contract AT(11-1)-1186

Unclassified report

Descriptors: (*Steam, Separation).

AD-446 447 Div. 20
CFSTI Prices: HC$4.00

EON Corp., Brooklyn, N. Y.
A PORTABLE FIELD CALIBRATOR FOR RADIOLOGICAL SURVEY INSTRUMENTS WHICH OPERATE OVER THE RANGE FROM BACKGROUND TO 500 r/hr.
Final rept.,
by N. G. Anton, J. Peale, and S. Sturtz. Jan 64, 108p
Contract OCD OS62 101
N64 32578

Unclassified report

Descriptors: (*Health physics instrumentation, Calibration), Posimeters, Dose rate, Uranium, Shielding, Gamma rays, Cesium, Tests, Human engineering, Portable, Radioactive isotopes, Performance (Engineering), Specifications, Design, Radiation measurement systems.

This report presents the results of a development program leading to the design and production of a prototype all-mechanical portable field calibrator for radiological survey instruments. Utilizing spent uranium as shielding material the calibrator contains a Cesium 137 gamma source of 220 curies. Variation in dose rate is accomplished by means of a series of eight attenuator slides which are also fabricated of uranium. The range of obtainable dose rates is from .4 mr/hr to 1000 r/hr. The radiation beam is directed into a test chamber which is in the form of a 16 inch cube. Instruments to be calibrated are viewed directly through a large lead glass window. The dose rate selector mechanism and interlock system for the access door employ a novel all-mechanical fail-safe design. A set of four probe wells containing Cesium sources is provided for the calibration of dosimeters and instruments which utilize external probes. The unit weighs 1125 pounds; is completely mobile; and requires no external source of power for its operation.

AEC-tr-6529 Div. 20, 25
CFSTI Prices: HC$1.00 MF$0.50

Atomic Energy Commission, Washington, D. C.
THE DEFLECTING SYSTEM OF A 5-Bev/c ANTIPROTON CHANNEL,
by M. S. Davydov, L. G. Dorfman, and V. V. Ekimov.
1964, 10p

Unclassified report

Trans. of International Conference on High-Energy Accelerators, Dubna, 21-27 Aug 63, Proceedings, p. 791-4.

Descriptors: (*Particle accelerators, Antiprotons), (*Antiprotons, Particle accelerators).

AEC-tr-6530 Div. 20, 25
CFSTI Prices: HC$1.00 MF$0.50

Atomic Energy Commission, Washington, D. C.
AN ELECTRODYNAMIC SEPARATOR FOR ANTI-PROTONS WITH MOMENTA OF 4 Bev/c,
by V. A. Vagin, V. I. Veksler, and V. N. Zubarev.
1964, 9p
Unclassified report

Trans. of International Conference on High-Energy Accelerators, Dubna, 21-27 Aug 63, Proceedings, p. 788-90.

Descriptors: (*Particle accelerators, Antiprotons), (*Antiprotons, Separation).

AEC-tr-6531 Div. 20, 25
CFSTI Prices: HC$1.00 MF$0.50

Atomic Energy Commission, Washington, D. C.
EXPERIMENTAL STUDY OF THE MULTIPLE ACCELERATION OF PROTONS (f = 69Mc) IN THE OIYI SYNCHROCYCLOTRON,
by S. V. Mukhin, S. V. Rikhvitskii, N. I. Semenyushkin, V. L. Stepanyuk, and I. Foltin. 1964, 8p
Unclassified report

Trans. of International Conference on High-Energy Accelerators, Dubna, 21-27 Aug 63, Proceedings, p.795-7.

Descriptors: (*Synchrocyclotrons, Protons), (*Protons, Synchrocyclotrons).

ANL-6935 Div. 20
CFSTI Prices: HC$2.00

Argonne National Lab., Ill.
SOME CONSIDERATIONS ON THE MELTDOWN PROBLEM FOR FARET,
by P. J. Persiani, A. Watanabe, U. Wolff, S. Grifoni, and B. Warman. Sep 64, 27p
Contract W-31-109-eng-38
Unclassified report

Descriptors: (*Reactor safety systems, Analysis).

ANL-6997 Div. 20
CFSTI Prices: HC$3.00

Argonne National Lab., Ill.
REACTOR DEVELOPMENT PROGRAM.
Progress rept. for Dec 64,
18 Jan 65, 70p
Contract W-31-109-eng-38
Unclassified report

Descriptors: (*Nuclear reactors, Nuclear engineering).

BAW-3376-1 Div. 20
CFSTI Prices: HC$3.00

Babcock and Wilcox Co., Lynchburg, Va.
IRRADIATION PERFORMANCE OF THORIAURANIA FUEL MATERIALS.
Quarterly technical rept. no. 1, May-Sep 64,
Sep 64, 86p Unclassified report
Contract AT(30-1)-3376

Descriptors: (*Reactor fuels, Performance (Engineering)), (*Thorium compounds, Dioxides), (*Uranium compounds, Dioxides).

BMI-1694(Del) Div. 20
CFSTI Prices: HC$1.00

Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING SEPTEMBER 1964,
by Russell W. Dayton and Ronald F. Dickerson.
1 Oct 64, 37p
Contract W-7405-eng-92
Unclassified report

Descriptors: (*Nuclear engineering, Reviews).

BMI-1697(Del) Div. 20
CFSTI Prices: HC$1.25

Battelle Memorial Inst., Columbus, Ohio.
PROGRESS RELATING TO CIVILIAN APPLICATIONS DURING OCTOBER 1964,
by Russell W. Dayton and Ronald F. Dickerson.
1 Nov 64, 47p
Contract W-7405-eng-92
Unclassified report

Descriptors: (*Nuclear engineering, Reviews).

BNL-8710 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
ROLE OF THE COMPUTER IN NEUTRON RESONANCE PARAMETER ANALYSIS,
by R. E. Chrien. 1964, 33p CONF-641004-1
Contract AT-30-2-GEN-16
Unclassified report

American Physical Society, Chicago.

Descriptors: (*Computers, Nuclear resonance), (*Neutrons, Resonance).

BNL-8761 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
AN RF BEAM SEPARATOR WITH MILLISECOND PULSE LENGTH,
by H. Hahn and H. J. Halama. 4 Jan 65, 6p
Contract AT-30-2-GEN-16
Unclassified report

Descriptors: (*Patricle beams, Separation).

BNL-8765 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
MULTITURN INJECTION IN THE AGS,
by M. Q. Barton. 18 Dec 64, 18p
Contract AT-30-2-GEN-16
Unclassified report

Descriptors: (*Particle accelerators, Injection).

BNL-8782 Div. 20, 25
CFSTI Prices: HC$1.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
R/Q MEASUREMENTS FOR DEFLECTING WAVEGUIDES,

by T. Ferbel and H. Hahn. 30 Dec 64, 13p
Contract AT-30-2-GEN-16
Unclassified report

Descriptors: (*Particle accelerators, Waveguides), (*Waveguides, Measurement).

CAPE-1152 Div. 20

Oak Ridge National Lab., Tenn.
DISPOSABLE LIGHT CHAMBER.
Engineering materials.
Unclassified drawing
Price information available from CFSTI upon request.
2 drawing, $0.75 handling,
$0.035/sq ft

Descriptors: (*Lighting equipment, Radiation measurement systems), (*Radiation measurement systems, Lighting equipment), Mechanical drawings, Penetration, Epoxy plastics, Contamination, Disposal, Gas filters, Nuclear particles.

This package contains 2 drawings. For a listing of individual titles see the Engineering Materials List (TID-4100). This light chamber is used with the Naval Research Laboratories (NRL) percent penetration meter. It replaces the NRL photometer light chamber with an inexpensive, disposable unit for testing systems that cause instrument contamination. The body is constructed by cementing together two identical epoxy resin castings. The internal dimensions duplicate the unit it is replacing. Glass discs cemented in place seal the ends and contain contamination within the disposable unit. The non-transmitting areas of the glass discs are covered with a nonreflective paper to reduce internal scattering of light. A gas-mask-canister filter located in the exit sample line prevents radioactive particulate matter from reaching the vacuum pump. The canister, disposable light chamber, and sample line tubing are discarded after use. (AEC abstract)

CAPE-1178 Div. 20

Oak Ridge National Lab., Tenn.
ALPHA OR BETA-GAMMA RADIATION MONITOR/ Q-2091/.
Engineering Materials.
Unclassified drawing
Price information available from CFSTI upon request.

Descriptors: (*Monitors, Mechanical drawings), (*Alpha particles, Monitors), (*Beta particles, Monitors), (*Gamma rays, Monitors), Count-rate meters, Geiger counters, Alpha counters, Alpha particle counters.

The vacuum-tube, general-purpose monitor is used in remote monitoring posts. This linear count-rate meter has a pulse amplifier and a high voltage supply for a detector. The power requirements are 115 v a-c, 0.40 amps, and 44w. A large area alpha probe may be used for aplha particle detection. Beta particles and gamma radiation are detected by a geiger tube. This instrument provides a 1-ma telemetering signal, a 10-mv strip chart recorder signal, an alarm control signal, and an audible indication of counting rate. (F.S.)

CONF-446-80 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
HYPOTHETICAL FAST OXIDE REACTOR MELTDOWN ACCIDENT WITH DOPPLER EFFECT,
by B. Wolfe, N. Friedman, and R. Meyer. 1964, 4p
Contract AT(04-3)-189
Unclassified report

American Nuclear Society Annual Meeting (10th), Philadelphia, Jun 64.

Descriptors: (*Fast reactors, Reactor accidents), (*Reactor accidents, Doppler effect).

CONF-654-26 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Knolls Atomic Power Lab., Schenectady, N. Y.
LEAST SQUARES VARIATIONAL ANALYSIS OF THE BURNUP PROBLEM,
by Martin Becker and Henri Fenech. 1964, 14p
Contract W-31-109-eng-52 Unclassified report

Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.
American Nuclear Society Meeting, San Francisco, Nov-Dec 64.

Descriptors: (*Reactor fuels, Mathematical analysis).

CONF-654-27 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Knolls Atomic Power Lab., Schenectady, N. Y.
A MEASUREMENT OF ALPHA FOR U-233 AND U235 IN THE EPITHERMAL REGION,
by L. J. Esch and F. Feiner. 1964, 15p
Contract W-31-109-eng-52 Unclassified report

American Nuclear Society Meeting, San Francisco, Nov-Dec 64.

Descriptors: (*Uranium, Radioactive series).

CONF-640606-3 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Colorado Univ., Boulder.
THE COLUTRON, MARK II, ZERO DEFLECTION ISOTOPE SEPARATOR,
by Robert G. Matlock and Lars Waehlin. 1964, 4p
Contract AT(11-1)-506
Unclassified report

American Physical Society Summer Meeting, Denver.

Descriptors: (*Isotope separation, Instrumentation).

CONF-650302-1 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Savannah River Plant, E. I. Du Pont de Nemours and Co., Aiken, S. C.
A POCKET DOSIMETER FOR CRITICALITY ACCIDENTS,
by W. C. Reinig, C. N. Wright, and J. E. Hoy.
Dec 64, 16p Unclassified report
Contract AT(07-2)-1

IAEA Symposium on Personnel Dosimetry for Accidental High-Level Exposure to External and Internal Radiation, Vienna.

Descriptors: (*Dosimeters, Radiation hazards).

COO-32-106 Div. 20, 4
CFSTI Prices: HC$2.00 MF$0.50

Wisconsin Univ., Madison.
EVIDENCE OF PRODUCTION OF NEUTRAL S35 ATOMS BY THE C135(n,p)S35 PROCESS IN ALKALI METAL CHLORIDES,
by R. C. Milham, A. Adams, and J. E. Willard.
1964, 24p CONF-773-8 Unclassified report
Contract AT(11-1)-32
Symposium on Chemical Effects Associated with Nuclear Reactions and Radioactive Transformation, Vienna, Dec 64.

Descriptors: (*Alkali metal compounds, Nuclear reactions).

DP-899 Div. 20
CFSTI Prices: HC$4.00

DuPont de Nemours (E. I.) and Co., Inc., Wilmington, Del.
LARGE HEAVY-WATER-MODERATED POWER REACTORS; AN ENGINEERING FEASIBILITY STUDY.
Nov 64, 143p
Contract AT(07-2)-1
Unclassified report

Descriptors: (*Power reactors, Feasibility studies), (*Heavy water reactors, Feasibility studies).

DP-928 Div. 20, 30
CFSTI Prices: HC$3.00

Savannah River Lab., E. I. Du Pont de Nemours and Co., Aiken, S. C.
CALCULATION OF HIGH-ENERGY EVENTS IN THERMAL REACTORS. II. A COMPUTER CODE, HEETR,
by Hugh K. Clark. Nov 64, 48p
Contract AT(07-2)-1
Unclassified report

Descriptors: (*Thermal reactors, Mathematical analysis), (*Programming (Computers), Thermal reactors).

GA-5800 Div. 20, 14
CFSTI Prices: HC$3.00 MF$0.75

General Atomic Div., General Dynamics Corp., San Diego, Calif.
SUMMARY STATUS OF THE PRESTRESSED CONCRETE REACTOR STRUCTURE PROGRAM.
3 Nov 64, 80p
Contract AT(04-3)-167 Unclassified report

Descriptors: (*Reactor materials, Nuclear engineering), (*Concrete, Reactor materials).

GAMD-3058 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

General Atomic Div., General Dynamics Corp., San Diego, Calif.
HTGR LOW-COBALT VALVE SEAT MATERIAL GALLING TESTS,
by W. L. Wyman. 23 Mar 62, 9p Unclassified report
Contract AT(04-3)-314

Descriptors: (*Reactor materials, Nuclear reactors), (*Cobalt, Reactor materials).

GEAP-3470 Div. 20, 21
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
NON-DESTRUCTIVE TESTING OF LOW COBALT STAINLESS STEEL FUEL CLADDING FOR CORE II, N. S. SAVANNAH. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by G. L. Boshears and E. L. Dunn. 22 Jun 60, 34p Unclassified report
Contract AT(04-3)-189

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuel cladding).

GEAP-4425 Div. 20
CFSTI Prices: HC$3.00 MF$0.75

Vallecitos Atomic Lab., General Electric Co., San Jose, Calif.
DEVELOPMENT AND FABRICATION OF ESADA-VESR MARK II SUPERHEAT FUEL,
by E. A. Lees, E. Esch, R. F. Kirby, H. S. Clair, and V. E. Hazel. 21 Sep 64, 79p
Contract AT(04-3)-189
Unclassified report

Descriptors: (*Reactor fuels, Preparation).

GEAP-4596 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
THE RELEASE OF FISSION GASES FROM URANIUM DIOXIDE PELLET FUEL OPERATED AT HIGH TEMPERATURES,
by J. P. Hoffman and D. H. Coplin. Sep 64, 28p
Contract AT(04-3)-189
Unclassified report

Descriptors: (*Uranium compounds, Dioxides), (*Reactor fuels, Fission products).

GEAP-4630 Div. 20
CFSTI Prices: HC$4.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
THE EFFECTS OF RESONANCE OVERLAP ON THE DOPPLER COEFFICIENT IN A FAST CERAMIC REACTOR. COMPUTER CODES RAVE AND DOPLE,
by B. A. Hutchins. Aug 64, 104p Unclassified report
Contract AT(04-3)-189

Descriptors: (*Fast reactors, Doppler effect), (*Doppler effect, Programming (Computers)).

GEAP-4714 Div. 20
CFSTI Prices: HC$4.00 MF$1.00

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
EVESR: NUCLEAR SUPERHEAT FUEL DEVELOPMENT PROJECT.
Quarterly rept. no. 9, Jun-Aug 64, Oct 64, 115p Unclassified report
Contract AT(04-3)-189

Descriptors: (*Reactor fuels, Nuclear engineering).

GEAP-4732 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Vallecitos Atomic Lab., General Electric Co., San Jose, Calif.
DEVELOPMENT OF PULSED NEUTRON APPLICATION TO POWER REACTOR START-UP PROCEDURES.
Quarterly progress rept. no. 10, 1 Jul-30 Sep 64,
by E. Garelis, P. Meyer, and A. E. Waltar. 20 Oct 64, 9p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Power reactors, Reactor start-up sources), (*Reactor start-up sources, Neutrons).

GEMP-329 Div. 20, 30
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., Cincinnati, Ohio. Advanced Technology Services.
PROGRAM FLUXWT (NMP-800); A FLUX WEIGHTING PROGRAM,
by W. B. Henderson. 5 Oct 64, 58p
Contract AT(40-1)-2847

Unclassified report

Descriptors: (*Neutron flux, Programming (Computers)).

HW-51934 Div. 20, 16
CFSTI Prices: HC$2.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
REPRODUCIBILITY OF PERSONNEL MONITORING FILM DENSITIES,
by R. H. Wilson. 25 Jul 57, 23p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Dosimeters, Photographic film), (*Photographic film, Dosimeters).

HW-65323 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
DISSOLUTION OF ZIRCALOY-CLAD ALUMINUM PLUTONIUM FUEL ELEMENTS,
by R. Sorenson and W. W. Schulz. 17 May 60, 11p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Reactor fuel processing, Solutions), (*Reactor fuel elements, Separation).

HW-81172 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
CONTROL SYSTEM SIMULATION NOMENCLATURE CONSIDERATIONS,
by C. D. Swanson. 4 Mar 64, 9p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Reactor control, Simulation).

HW-81259 Div. 20
CFSTI Prices: HC$3.00

Hanford Atomic Products Operation, Richland, Wash.
NEUTRON KINETICS PROBLEMS ASSOCIATED WITH MIXED OXIDE FUELS,
by R. E. Peterson. Jul 64, 49p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Reactor fuels, Reactor safety systems).

HW-83092 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
TIME-VARIABLE TIME DELAY FOR ANALOG COMPUTER SIMULATIONS,
by R. A. Walker. 12 Oct 64, 24p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Nuclear engineering, Computers), (*Instrumentation, Nuclear reactors).

HW-83218 Div. 20, 13
CFSTI Prices: HC$2.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
FIRST IN-TANK WASTE SOLIDIFICATION UNIT INFORMATION MANUAL,
comp. by J. J. Shefcik. 1 Aug 64, 47p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Radioactive waste, Disposal).

HW-83431 Div. 20
CFSTI Prices: HC$3.00 MF$0.75

Hanford Atomic Products Operation, Richland, Wash.
ANALYSIS OF MTR CYCLE 108, LOW EXPOSURE PLUTONIUM CORES,
by J. J. Regimbal. 9 Nov 64, 64p
Contract AT(45-1)1350

Unclassified report

Descriptors: (*Reactor cores, Plutonium), (*Plutonium, Reactor cores).

HW-83868 Div. 20
CFSTI Prices: HC$1.00

Hanford Atomic Products Operation, Richland, Wash.
MINIATURE SIGNALING RADIATION DOSIMETER,
by D. P. Brown. Nov 64, 21p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Dosimeters, Miniature electronic equipment).

HW-83967 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
CREEP DATA LOGGER,
by L. L. Azure, Jr. Sep 64, 37p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Nuclear engineering, Instrumentation), (*Creep, Recording systems).

HW-84251 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
IN-LINE PLUTONIUM ANALYSIS BY USE OF ALPHA SCINTILLATING GLASS AND X-RAY SCINTILLATION TECHNIQUES,
by C. E. Huck and J. D. Lodge. 14 Oct 64, 23p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Plutonium, Analysis).

HW-84451 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
SHIELDING REQUIREMENTS FOR MOXTYL FUELS,
by L. G. Faust. 22 May 64, 3p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Reactor fuels, Shielding), (*Health physics, Shielding).

HW-84467 Div. 20, 13
CFSTI Prices: HC$2.00

Hanford Atomic Products Operation, Richland, Wash.
RESEARCH AND DEVELOPMENT ACTIVITIES FIXATION OF RADIOACTIVE RESIDUES.
Quarterly progress rept. for Jul-Sep 64,
ed. by A. M. Platt. Oct 64, 39p
Contract AT(45-1)-1350
Unclassified report

Descriptors: (*Radioactive waste, Disposal).

HW-SA-3683 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
RADIOACTIVE AIRBORNE POLLUTANTS: EFFECTIVE CONTROL IN A NUCLEAR POWER ECONOMY,
by L. C. Schwendiman. 19 Oct 64, 19p
CONF-641103-1
Contract AT(45-1)-1350
Unclassified report

Air Pollution Control Assn. Annual Meeting Northwest Section, Portland, Oreg.

Descriptors: (*Air pollution, Control), (*Radiological contamination, Control).

IDO-14649 Div. 20
CFSTI Prices: HC$2.00

Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
BURNUP DETERMINATION OF NUCLEAR FUELS: 1963 ANNUAL PROGRESS REPORT,
ed. by J. E. Rein and W. J. Maeck. Nov 64, 27p
Contract AT(10-1)-205
Unclassified report

Descriptors: (*Reactor fuels, Analysis).

IDO-16981 Div. 20
CFSTI Prices: HC$7.06 MF$1.75

Phillips Petroleum Co., Idaho Falls, Atomic Energy Div.
PRELIMINARY SAFETY ANALYSIS REPORT, LOFT FACILITY,
by F. W. Ahrens, G. A. Dinneen, and R. D. Fletcher.
Apr 64, 406p
Contract AT(10-1)-205
Unclassified report

Descriptors: (*Reactor safety, Analysis).

IDO-17032 Div. 20
CFSTI Prices: HC$3.00 MF$0.50

Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
TAN HOT SHOP AND SATELLITE FACILITIES,
ed. by R. A. Freeman. Nov 64, 89p
Contract AT(10-1)205
Unclassified report

Descriptors: (*Reactor safety systems, Reviews).

IDO-17050 Div. 20
CFSTI Prices: HC$3.00

Phillips Petroleum Co., Idaho Falls, Idaho. Atomic Energy Div.
GAMMA-RAY SPECTROMETRY OF NEUTRON-DEFICIENT ISOTOPES,
by R. L. Heath and J. E. Cline. Nov 64, 67p
Contract AT(10-1)-205
Unclassified report

Descriptors: (*Radioactive isotopes, Gamma-ray spectra), (*Gamma-ray spectroscopy, Radioactive isotopes).

IITRI-578P22-11 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

IIT Research Inst., Chicago, Ill.
STUDIES OF REACTOR CONTAINMENT STRUCTURES.
Bi-monthly progress rept.,
by R. L. Chiapetta and M. A. Salmon. Dec 64, 28p
Contract AT(11-1)578
Unclassified report

Descriptors: (*Containment, Structures).

LA-3148-MS Div. 20
CFSTI Prices: HC$3.00

Los Alamos Scientific Lab., Univ. of California, N. Mex.
TEMPERATURE DEPENDENT KINETICS OF COUPLED-CORE REACTORS,
by C. G. Chezem and R. L. Seale. Jul 64, 89p
Contract W-7405-eng-36
Unclassified report

Descriptors: (*Reactor kinetics, Temperature).

LA-3166-MS Div. 20
CFSTI Prices: HC$2.00

Los Alamos Scientific Lab., Univ. of California, N. Mex.
COMPUTATIONAL SURVEY OF HOMOGENEOUS WATER-MODERATED SYSTEMS,
by Peter M. Wallis. Jan 64, 41p
Contract W-7405-eng-36
Unclassified report

Descriptors: (*Homogeneous reactors, Critical assemblies).

LA-3208-MS Div. 20
CFSTI Prices: HC$1.00

Los Alamos Scientific Lab., Univ. of California, N. Mex.
PLUTONIUM REACTOR FUEL DEVELOPMENT.
Quarterly status rept. for period ending 20-Nov 64.
Dec 64, 20p Unclassified report
Contract W-7405-eng-36

Descriptors: (*Reactor fuels, Plutonium), (*Plutonium, Reactor fuels).

LA-DC-6670 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
TRANSITION STATES AT THE FISSION BARRIER,
by James J. Griffin. 1964, 19p CONF-650301-2
Contract W-7405-eng-36
Unclassified report

For presentation at Symposium on the Physics and Chemistry of Fission, Salzburg, Austria.

Descriptors: (*Fission, Nuclear energy levels).

LA-DC-6673 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
EFFECTS OF ORBITAL ANGULAR MOMENTUM AND TARGET SPIN ON FISSION ANISOTROPY,
by L. Blumberg, Judith Gursky, and R. B. Leachman.
1964, 21p CONF-650301-1
Contract W-7405-eng-36
Unclassified report

For presentation at Symposium on the Physics and Chemistry of Fission, Salzburg, Austria.

Descriptors: (*Fission, Anisotropy).

LA-DC-6712 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
PLUTONIUM FUELS,
comp. by J. A. Leary. 20 Oct 64, 7p
CONF-641111-2 Unclassified report
Contract W-7405-eng-36

UV-Japan Information Exchange Meeting on Ceramic Nuclear Fuels (19th) High Temperature Fuels Committee Meeting, Canoga Park, Calif.

Descriptors: (*Reactor fuels, Plutonium), (*Plutonium, Reactor fuels).

LA-DC-6713 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
UHTREX FUEL IRRADIATIONS,
by P. J. Peterson. 7 Oct 64, 12p CONF-641111-3
Contract W-7405-eng-36 Unclassified report

US-Japan Information Exchange Meeting on Ceramic Nuclear Fuels (19th) High Temperature Fuels Committee Meeting, Canoga Park, Calif.

Descriptors: (*Reactor fuels, Metallurgy).

NAA-SR-8119 Div. 20
CFSTI Prices: HC$2.00
Atomics International, Canoga Park, Calif.
STUDY OF SCTI CONTROL SYSTEM,
ed. by C. W. Griffin. 1 Dec 64, 269p
Contract AT-11-1-GEN-8
Unclassified report

Descriptors: (*Reactor control, Analysis).

NRL-Memo-1556 Div. 20, 14
CFSTI Prices: HC$2.00 MF$0.50

Naval Research Lab., Washington, D. C.
IRRADIATION EFFECTS ON REACTOR STRUCTURAL MATERIALS.
Rept. for 1 May-31 Jul 64,
by L. E. Steele, J. R. Hawthorne, and C. Z. Serpan, Jr. 15 Aug 64, 40p
Contract AT(49-5)-2110
Unclassified report

Descriptors: (*Reactor materials, Radiation damage), (*Radiation damage, Reactor materials).

NUMEC-2389-4 Div. 20
CFSTI Prices: HC$3.00 MF$0.75

Nuclear Materials and Equipment Corp., Apollo, Pa.
DEVELOPMENT OF PLUTONIUM-BEARING FUEL MATERIALS.
Progress rept. for 1 Jan-31 Mar 64.
31 Mar 64, 66p
Contract AT(30-1)2389
Unclassified report

Descriptors: (*Reactor fuels, Plutonium), (*Plutonium, Reactor fuels).

NYO-2910-6 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Aeroprojects, Inc., West Chester, Pa.
APPLICATIONS OF ULTRASONIC ENERGY, ULTRASONIC INSTRUMENTATION FOR NUCLEAR APPLICATIONS.
Bi-monthly progress rept. no. 18, 1 Aug-30 Sep 64.
Oct 64, 9p
Contract AT(30-1)2910
Unclassified report

Descriptors: (*Ultrasonic radiation, Instrumentation).

ORNL-3624 Div. 20
CFSTI Prices: HC$3.00

Oak Ridge National Lab., Tenn.
NBC, AN IBM-7090 COMPUTER PROGRAM FOR SOLVING THERMOELASTIC PROBLEMS,
by F. J. Witt. Jan 65, 54p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Nuclear engineering, Computers).

ORNL-3664 Div. 20, 26
CFSTI Prices: HC$1.00

Oak Ridge National Lab., Tenn.

VACUM LEAK TESTING OF RADIOACTIVE SOURCE CAPSULES,
by C. R. King. Jan 65, 11p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Radioactive isotopes, Containers), (*Containers, Test methods).

ORNL-3672 Div. 20
CFSTI Prices: HC$3.00

Oak Ridge National Lab., Tenn.
14-M NEUTRON REACTIONS,
by J. E. Strain and W. J. Ross. Jan 65, 63p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Neutron reactions, Reviews).

ORNL-3686 Div. 20
CFSTI Prices: HC$6.00

Oak Ridge National Lab., Tenn.
A COMPARATIVE EVALUATION OF ADVANCED CONVERTERS,
by M. W. Rosenthal, R. E. Adams, and L. L. Bennett. Jan 65, 257p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Nuclear reactors, Economics).

ORNL-3714(Vol. I) Div. 20, 25
CFSTI Prices: HC$4.00

Oak Ridge National Lab., Tenn.
NEUTRON PHYSICS DEVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING AUGUST 1, 1964.
Dec 64, 102p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Neutrons, Reviews).

ORNL-3714(Vol.II) Div. 20, 25
CFSTI Prices: HC$3.00

Oak Ridge National Lab., Tenn.
NEUTRON PHYSICS DIVISION ANNUAL PROGRESS REPORT FOR PERIOD ENDING AUGUST 1, 1964.
Dec 64, 57p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Neutrons, Reviews).

ORNL-3722 Div. 20, 25
CFSTI Prices: HC$2.00

Oak Ridge National Lab., Tenn.
THE SPACE, TIME, AND ENERGY DISTRIBUTIONS OF THE PROTON BEAM OF THE HARVARD UNIVERSITY SYNCHROCYCLOTRON,
by R. T. Santoro. Jan 65, 37p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Proton beams, Proton accelerators).

ORNL-3723 Div. 20
CFSTI Prices: HC$3.00

Oak Ridge National Lab., Tenn.
IMPACT RESISTANCE OF FUELED GRAPHITE SPHERES FOR PEBBLE-BED REACTOR APPLICATIONS,
by C. O. Smith and J. M. Robbins. Jan 65, 69p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Reactor fuels, Nuclear reactors).

ORNL-3725 Div. 20, 4
CFSTI Prices: HC$2.00

Oak Ridge National Lab., Tenn.
DISSOLUTION OF IRRADIATED, STAINLESS-STEEL-CLAD TO2-UO2 IN FLUORIDE-CATALYZED NITRIC ACID SOLUTIONS: HOT-CELL STUDIES ION PELLETIZED, ARC-FUSED, AND SOL-GEL-DERIVED OXIDES,
by J. H. Goode and J. R. Flanary. Jan 65, 25p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Reactor fuel processing, Solutions), (*Thorium compounds, Dioxides), (*Uranium compounds, Dioxides).

ORNL-3737 Div. 20, 17
CFSTI Prices: HC$2.00

Oak Ridge National Lab., Tenn.
CONTINUOUS SCANNING X-RAY ATTENUATION TECHNIQUE FOR DETERMINING FUEL INHOMOGENEITIES IN DISPERSION CORE FUEL PLATES,
by B. E. Foster, S. D. Snyder, and R. W. McClung.
Jan 65, 25p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Reactor fuels, Metallurgy).

ORNL-3744 Div. 20, 4, 25
CFSTI Prices: HC$3.00

Oak Ridge National Lab., Tenn.
DETERMINATION OF NUCLIDE CONCENTRATIONS IN SOLUTIONS CONTAINING LOW LEVELS OF RADIOACTIVITY BY LEAST-SQUARES RESOLUTION OF THE GAMMA-RAY SPECTRA,
by E. Schonfeld, A. H. Kibbey, and W. Davis, Jr.
Jan 65, 59p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Nuclides, Gamma-ray spectroscopy), (*Gamma-ray spectra, Resolution).

ORNL-3747 Div. 20
CFSTI Prices: HC$1.00

Oak Ridge National Lab., Tenn.
STRESS-STRAIN MEASURING SYSTEM FOR IN-REACTOR USE IN HIGH NEUTRON FLUX,
by W. W. Davis and C. R. Kennedy. Jan 65, 8p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Nuclear reactors, Test equipment), (*Reactor materials, Test equipment).

ORNL-3756 Div. 20
CFSTI Prices: HC$2.00

Oak Ridge National Lab., Tenn.
NEUTRON FLUX SPECTRA IN THE EXPERIMENTAL FACILITIES OF THE OAK RIDGE RESEARCH REACTOR,
by C. D. Baumann. Jan 65, 26p
Contract W-7405-eng-26 Unclassified report

Descriptors: (*Research reactors, Neutron flux), (*Neutron flux, Neutron spectrum).

ORNL-3757 Div. 20
CFSTI Prices: HC$3.00

Oak Ridge National Lab., Tenn.
SPECULATIONS ON THE INTERPRETATION OF NEUTRON NOISE EXPERIMENTS,
by R. K. Osborn. Jan 65, 77p
Contract W-7405-eng-26 Unclassified report

Descriptors: (*Spacecraft, Reactor safety systems).

ORNL-P-744 Div. 20
CFSTI Prices: HC$5.00 MF$1.00

Oak Ridge National Lab., Tenn.
A REVIEW OF THE MAGNETIC FIELD SHAPING METHODS USED IN THE DEVELOPMENT OF THE 225C OAK RIDGE ISOTOPE SEPARATOR,
by William Kelly Dagenhart. Dec 64, 159p
Contract W-7405-eng-26
Unclassified report

Thesis submitted to Univ. of Tennessee, Knoxville.

Descriptors: (*Isotope separation, Magnetic fields).

ORNL-P-782 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
CONVERSION OF A CALUTRON INTO A 180 DEGREE SECTOR SEPARATOR WITH 0.8 INHOMOGENEITY,
by T. W. Whitehead, Jr., W. K. Dagenhart, W. A. Bell, Jr., and L. O. Love. 1964, 8p CONF-641110-2
Contract W-7405-eng-26
Unclassified report

Tennessee Academy of Science Meeting, Memphis.

Descriptors: (*Isotope separation, Nuclear engineering).

ORNL-P-844 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
COMPARISON OF MEASURED DEUTRON AND PROTON SPECTRA WITH CALCULATED SPECTRA IN THE ENERGY REGION BETWEEN 50 AND 160 Mev,
by W. A. Gibson, W. R. Burrus, W. E. Kinney, J. W. Wachter, and C. F. Johnson. 1964, 8p
CONF-720-3
Contract W-7405-eng-26 Unclassified report

Prepared in cooperation with General Dynamics/Fort Worth, Tex. Symposium on Protection Against Radiation Hazards in Space (2nd), Gatlinburg, Tenn., Oct 64.

Descriptors: (*Protons, Nuclear spectroscopy), (*Deuterons, Nuclear spectroscopy).

ORNL-P-848 Div. 20, 25
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
DIFFERENTIAL CROSS SECTIONS BY FLIGHT-TIME SPECTROSCOPY FOR PROTON PRODUCTION IN REACTIONS OF 160-Mev PROTONS ON NUCLEI,
by R. W. Peelle, T. A. Love, N. W. Hill, and R. T. Santoro. 1964, 17p CONF-720-4
Contract W-7405-eng-26
Unclassified report

Symposium on Protection Against Radiation Hazards in Space (2nd), Gatlinburg, Tenn., Oct 64.

Descriptors: (*Proton cross sections, Mass spectroscopy).

ORNL-P-856 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
RADIOISOTOPE SHIPPING CONTAINER DEVELOPMENT,
by K. W. Haff. 1964, 8p CONF-641201-13
Contract W-7405-eng-26
Unclassified report

American Institute of Chemical Engineers Annual Meeting, Boston.

Descriptors: (*Radioactive isotopes, Transportation), (*Containers, Design).

ORNL-TM-728 Div. 20
CFSTI Prices: HC$8.61 MF$2.50

Oak Ridge National Lab., Tenn.
MSRE DESIGN AND OPERATIONS REPORT. PART I. DESCRIPTION OF REACTOR DESIGN,
by R. C. Robertson. Jan 65, 561p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Nuclear reactors, Design).

ORNL-TM-1004 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

Oak Ridge National Lab., Tenn.
STRESS-RUPTURE TESTING OF EGCR FUEL TUBES,
by J. T. Venard. Jan 65, 28p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Reactor fuels, Stresses), (*Metallurgy, Rupture).

ORNL-TM-1011 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

Oak Ridge National Lab., Tenn.
PROPERTIES OF BeO COMPACTS IRRADIATED TO FAST-NEUTRON DOSES GREATER THAN 10 TO THE 21ST POWER NEUTRONS/SQ. cm AT 110, 650, AND 1100C,
by G. W. Keilholtz, J. E. Lee, Jr., and R. E. Moore. 1 Dec 64, 31p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Reactor materials, Radiation damage), (*Radiation damage, Ceramic materials).

ORNL-TM-1023 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
TUBE PLUGGING IN THE MOLTEN-SALT REACTOR EXPERIMENT PRIMARY HEAT EXCHANGER,
by R. G. Donnelly. Feb 65, 11p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Heat exchangers, Liquid metal coolants).

ORNL-tr-356 Div. 20, 25
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
USING THE MONTE CARLO METHOD FOR CALCULATING THE PASSAGE OF GAMMA QUANTA THROUGH A SUBSTANCE,
by A. F. Akkerman and D. K. Kaipov. 1964, 16p
Unclassified report

Trans. of Akademiya Nauk Kazakhskoi SSR Alma Ata. Institut Yadernoi Fiziki. Trudy, 1960, v. 3, p. 106-14.

Descriptors: (*Gamma rays, Monte Carlo method), (*Monte Carlo method, Gamma rays).

Patent 3,162,509 Div. 20, 14

PROCESS FOR PREPARATION OF SULFUR-CONTAINING COMPOUNDS OF PLUTONIUM.
Patent assigned to AEC,
by Norman R. Davidson. 22 Dec 64 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Plutonium compounds), (*Refractory materials, Patents), (*Plutonium compounds, Sulfides), Dioxides, Hydrogen compounds, Graphite, Breeder reactors.

Diplutonium dioxysulfide and diplutonium trisulfide are useful as refractory materials. The products are prepared by contacting plutonium dioxide with hydrogen sulfide in the presence of graphite at an elevated temperature.

Patent 3,162,527 Div. 20, 17

PLUTONIUM ALLOYS CONTAINING CONTROLLED AMOUNTS OF PLUTONIUM ALLOTROPES OBTAINED BY APPLICATION OF HIGH PRESSURES.
Patent assigned to AEC,
by Reed O. Elliott and Karl A. Gschneidner, Jr. 22 Dec 64
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Plutonium alloys), (*Plutonium alloys, Patents), (*Reactor fuels, Plutonium alloys), Aluminum alloys, Cerium alloys, Gallium alloys, Indium alloys, Stabilization, Transformations, Pressure.

The alloys are useful as nuclear fission reactor fuels in the form of solid rods or other shapes. A stabilized plutonium base alloy containing from 0.6 to 4.0 atom percent gallium aluminum, or zinc is made by compressing the alloy to its transformation pressure and continuing to compress the alloy until the volume decrease with increasing pressure is negligible.

Patent 3,162,578 Div. 20

REACTOR AND APPARATUS FOR CONTROL THEREOF.
Patent assigned to AEC,
by Abbott Allen. 22 Dec 64 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Reactor system components), (*Reactor system components, Patents), (*Control rods, Reactor control), Nuclear reactor, Liquid cooled, Pneumatic devices, Reactor safety system.

An operating mechanism is disclosed for the control rods of a nuclear reactor of the liquid cooled type. The control rod operating mechanism is of the pneumatic type and includes a source of fluid pressure such as compressed air. The control rod is moved into the reactor by a main operating piston. The piston, a pusher rod and the control rod form a unit assembly.

Patent 3,163,915 Div. 20, 26

METHOD OF FABRICATING SURFACE-BARRIER DETECTORS.
Patent assigned to AEC,
by Richard J. Fox. 5 Jan 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Radiation measurement systems), (*Radiation measurement systems, Patents), Silicon, Semiconductors, Crystals, Coincidence counting, Nuclear particles.

A method is given for making silicon surface-barrier nuclear particle detectors. The detector is made from n-type silicon crystals. It is made so that there is no interfering structure on the 'back'. Thus, the detector elements may be stacked for certain types of measurements.

Patent 3,165,417 Div. 20, 14

HIGH STRENGTH BERYLLIA ARTICLES.
Patent assigned to AEC,
by Percy P. Turner, Jr. 12 Jan 65 Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Reactor materials), (*Reactor materials, Patents), (*Beryllium compounds, Oxides), Ceramic materials, Toughness, Refractory materials, Carbides, Microstructure.

The beryllia is used in nuclear reactors. The articles have a restricted grain growth. High purity beryllia is intimately mixed with from 0.1 to 0.2 weight percent of a grain growth inhibitor from the group consisting of carbon and refractory carbides.

Patent 3,165,422 Div. 20, 14

CERAMIC COATED FUEL PARTICLES.
Patent assigned to AEC,
by Lincoln D. Stoughton, John M. Blocher, Jr., and Neil D. Veigel. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Reactor fuel elements), (*Reactor fuel elements, Patents), (*Ceramic coatings, Reactor fuel elements), Fission products, Gas-cooled reactors.

Particles of UO2 are coated with a first layer of porous Al2O3 and a second outer layer of impermeable, alpha phase Al2O3. The coating takes place in a reactor containing a fluidized bed of UO2. The particles are coated in two hydrolyzing steps to vapor deposit the coatings on the particles.

Patent 3,165,448 Div. 20

NUCLEAR REACTOR CORE AND FUEL ASSEMBLY.
Patent assigned to AEC,
by William H. McCorkle and Harry S. Corn. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Reactor system components), (*Reactor system components, Patents), Reactor cores, Reactor fuel elements, Research reactors, Design.

The fuel assembly for a nuclear reactor includes a plurality of spaced concentric fuel tubes containing highly enriched uranium. A cylindrical aluminum thimble is disposed in the fuel tubes, and a beryllium cylinder is disposed in the thimble. A boron-aluminum rod is disposed in the beryllium cylinder. An arrangement is provided for passing water through and between the fuel tubes.

PB-166 778 Div. 20, 2
CFSTI Prices: HC$4.00 MF$1.00

Defense Atomic Support Agency, Albuquerque, N. Mex.
ATOMIC CLOUD GROWTH STUDY,
by B. H. Grossman, L. Machta, L. R. Quenneville, S. W. Dossi, and J. Halsey. Oct 55, 138p
Proj. 9 4
WT 1152; AD 426 840
Unclassified report

Rept. on Operation Teapot, Nevada Test Site, Feb-May 55. Document contains halftone illustrations which are difficult to read in reprints.

Descriptors: (*Atomic clouds, Configuration), Nuclear explosions, Explosion effects, Propagation, Meteorological parameters, Photographic analysis, Theodolites, Air force research, Experimental data, Tables, Graphics.

The purpose of this project was twofold: first, to document the evolution of atomic clouds during the TEAPOT series in order to define the rate of rise, maximum height, vertical depth of mushroom, dimensions of stem and volume, for a period up to 20 min after burst when photographically feasible; second, to correlate the meteorological data with the available cloud data on past Nevada test series as well as the TEAPOT series. Photographic and theodolite data were collected on 14 shots. Analysis of weather parameters affecting cloud heights attained does not suggest any clear-cut definitions with the exception of the tropopause dampening effect. Application of current theories has been investigated and the results compared.

PPAD-507-E Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Princeton-Pennsylvania Accelerator, Princeton, N. J.
PRECISION VARIABLE DELAY LINE AND SPLITTER,
by J. Kirchgessner and J. Riedel. 9 Dec 63, 11p
Contract AT(30-1)-2137
Unclassified report

Descriptors: (*Instrumentation, Nuclear physics).

PPAD-529-E Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Princeton-Pennsylvania Accelerator, Princeton, N. J.
PREPARATION AND PERFORMANCE OF A HOMOGENEOUS SILICON MINIMUM-IONIZING PARTICLE DETECTOR,
by H. Blumenfeld and F. P. Pandolfi. 29 Oct 64, 14p CONF-799-11
Contract AT(30-1)-2137
Unclassified report

Annual Nuclear Science Symposium (11th), Philadelphia, Oct 64.

Descriptors: (*Radiation measurement systems, Semiconductor devices).

REIC-ACCESS-82 Div. 20, 14
CFSTI Prices: HC$2.00 MF$0.50

Radiation Effects Information Center, Columbus, Ohio.
MONTHLY ACCESSION LIST ON RADIATION EFFECTS DATA. ABSTRACT NO. 25763 TO 25816.
10 Jan 65, 33p
Contracts W-7405-eng-92, AF33 (615)-1124
Unclassified report

Includes Monthly Accession List Coordinate Index. Accession Lists from 1 Oct-31 Dec 64.

Descriptors: (*Radiation damage, Bibliographies).

RFP-418 Div. 20
CFSTI Prices: HC$2.00

Rocky Flats Div., Dow Chemical Co., Golden, Colo.
STUDY OF PLUTONIUM OXIDE HEAT GENERATION IN A WOOD-MODERATED CONTAINER,
by J. D. Moseley. 28 Dec 64, 29p
Contract AT(29-1)-1106
Unclassified report

Descriptors: (*Plutonium compounds, Oxides), (*Health physics, Plutonium compounds).

SC-RR-64-1757 Div. 20
CFSTI Prices: HC$2.00 MF$0.50

Sandia Lab., Albuquerque, N. Mex.
RADIATION FLUX MAP REPORT, SANDIA ENGINEERING REACTOR FACILITY,
by C. B. Becherer. Jan 65, 39p
Contract AT(29-1)-789
Unclassified report

Descriptors: (*Research reactors, Nuclear engineering).

SRO-109 Div. 20
CFSTI Prices: HC$3.00 MF$0.50

Savannah River Operations Office, Atomic Energy Commission.
SURVEY OF DIVERSIFICATION POTENTIAL AT SAVANNAH RIVER.
Dec 64, 55p
Unclassified report

Descriptors: (*Power reactors, Management planning).

SRO-111 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Savannah River Operations Office, Atomic Energy Commission.
HEAVY WATER POWER REACTOR PROGRAM MONTHLY PROGRESS REPORT, DECEMBER 1964.
Dec 64, 5p
Unclassified report

Descriptors: (*Heavy water reactors, Reviews), (*Power reactors, Reviews).

TID-21444 Div. 20, 22
CFSTI Prices: HC$3.00 MF$0.75

Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.
TRANSLATIONAL EFFECTS OF BLAST WAVES. A REVIEW OF PAST WORK AND SUGGESTIONS FOR FUTURE EXPERIMENTS WITH 500-TON HIGH-EXPLOSIVE SHOT.
Technical progress rept.,
by I. G. Bowen, D. R. Richmond, and C. S. White. 11 Mar 63, 62p
Contract DA-49-146-XZ-055
Unclassified report

Descriptors: (*Nuclear explosions, Health physics), (*Health physics, Blast).

TID-21446 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Phylatron Corp., Columbus, Ohio.
DEVELOPMENT OF A HIGH-SENSITIVITY FAST NEUTRON DOSIMETER.
Quarterly rept. no. 6, 1 Aug-31 Oct 64,
by B. H. Chase, R. R. F. Speers, J. M. Swartz, and M. O. Thurston. 31 Oct 64, 5p
Contract AT(11-1)-1226
Unclassified report

Descriptors: (*Dosimeters, Fast neutrons), (*Fast neutrons, Dosimeters).

UCRL-2426(Vol. III) (1965 Rev.) Div. 20
CFSTI Prices: HC$4.00

Lawrence Radiation Lab., Univ. of California, Berkeley.
HIGH-ENERGY PARTICLE DATA. VOLUME III. KINEMATICS OF PARTICLES AS A FUNCTION OF MOMENTUM,
by W. Peter Trower. Jan 65, 114p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Elementary particles, Dynamics).

UCRL-7734 Div. 20
CFSTI Prices: HC$1.00

Lawrence Radiation Lab., Univ. of California, Livermore.
FORTRAN PROGRAMS USEFUL IN SCATTERING EXPERIMENTS,
by S. F. Eccles, H. F. Lutz, and J. Stevens.
19 Jun 64, 36p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Nuclear scattering, Programming (Computers)).

UCRL-11328(Rev. 1) Div. 20
CFSTI Prices: HC$2.00

Lawrence Radiation Lab., Univ. of California, Berkeley.
MECHANISM OF HYPERFRAGMENT FORMATION IN K-MINUS CAPTURE,
by J. W. Patrick and P. L. Jain. 9 Nov 64, 22p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*K mesons, Meson capture), (*Meson capture, Theory).

UCRL-11344 Div. 20
CFSTI Prices: HC$3.00

Lawrence Radiation Lab., Univ. of California, Berkeley.
RECENT DEVELOPMENTS IN THE THEORY OF WEAK INTERACTIONS.
Lecture Notes,
by Nicola Cabibbo. 17 Mar 64, 94p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Nuclear reactions, Theory).

UCRL-11760 Div. 20
CFSTI Prices: HC$3.00 MF$0.75

Lawrence Radiation Lab., Univ. of California, Berkeley.
AN IMPROVED METHOD OF NEUTRON SPECTROSCOPY USING THRESHOLD DETECTORS.
Thesis,
by Arthur Degen Kohler, Jr. 11 Dec 64, 75p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Nuclear spectroscopy, Radiation measurement systems).

UCRL-12028 Div. 20, 25
CFSTI Prices: HC$4.00

Lawrence Radiation Lab., Univ. of California, Livermore.
CONTROLLED THERMONUCLEAR RESEARCH SEMIANNUAL REPORT, JANUARY-JUNE 1964.
Jun 64, 45p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Thermonuclear reactions, Control), (*Plasma physics, Thermonuclear reactions).

UCRL-12064 Div. 20
CFSTI Prices: HC$2.00

Lawrence Radiation Lab., Univ. of California, Livermore.
CRUD, A FISSION-PRODUCT DIFFUSION CODE FOR THE CDC 3600 AND IBM 7094,
by G. M. Litton and C. R. Hunt. 1 Sep 64, 41p
Contract W-7405-eng-48
Unclassified report

Descriptors: (*Fission products, Diffusion).

UCRL-12128 Div. 20
CFSTI Prices: HC$2.00

Lawrence Radiation Lab., Univ. of California, Livermore.

ON THE ACCURACY OF DIFFUSION THEORY FOR NEUTRON MODERATION,
by J. R. Terrall. Aug 64, 26p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Reactory moderators, Neutron transport theory), (*Neutron transport theory, Effectiveness).

UCRL-12150 Div. 20
CFSTI Prices: HC$2.00

Lawrence Radiation Lab., Univ. of California, Livermore.
DETERMINING SCINTILLATOR RESPONSE TO PHOTONS AND NEUTRONS BY MONTE CARLO,
by Charles M. Ankenbrandt. 30 Sep 64, 30p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Scintillation counters, Monte Carlo method), (*Photons, Counting methods), (*Neutrons, Counting methods).

UCRL-12170 Div. 20, 25
CFSTI Prices: HC$1.00

Lawrence Radiation Lab., Univ. of California, Livermore.
ON THE CALCULATION OF A COLLISION DISTANCE WHEN CONDITIONS ALONG THE PATH ARE CONTINUALLY CHANGING,
by J. R. Terrall. 5 Nov 64, 9p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Nuclear reactions, Mathematical analysis).

UCRL-13128 Div. 20, 26
CFSTI Prices: HC$4.00 MF$1.00

Lawrence Radiation Lab., Univ. of California, Livermore.
FABRICATION PROCESS FOR HIGH-VOLTAGE PIN DETECTORS, PART I. RESEARCH AND DEVELOPMENT ON FABRICATION OF PIN AND LID DETECTORS AND THE DRY RUN INTERFACE SYSTEM, PART II, APPENDIX.
1 Sep 64, 113p
Contract W-7405-eng-48

Unclassified report

Subcontracted to Solid State Radiations, Inc., Los Angeles, Calif.

Descriptors: (*Radiation measurement systems, Semiconductor devices).

UCRL-Trans-1108(L) Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
ROAR OF PEACEFUL EXPLOSIONS,
by M. Sitil. 1964, 4p

Unclassified report

Trans. of Nauka i Zhyttya (USSR) 1962, v. 12, p. 43ff.

Descriptors: (*Nuclear explosions, Nuclear bombs).

UNC-5102 Div. 20, 4
CFSTI Prices: HC$2.00 MF$0.50

United Nuclear Corp., White Plains, N. Y. Development Div.
STUDY OF URANIUM, PLUTONIUM MONOXIDES.
Progress rept. for 1 Aug-31 Oct 64,
by D. Stahl, A. Strasser, J. Andersen, and K. Taylor.
28 Dec 64, 42p EURAEC-1287
Contract AT(30-1)3305

Unclassified report

Prepared in cooperation with Carborundum Co., Niagara Falls, N. Y.

Descriptors: (*Uranium compounds, Monoxides), (*Plutonium compounds, Monoxides), (*Reactor fuels, Corrosion).

WAPD-LPR-181 Div. 20
CFSTI Prices: HC$4.00 MF$0.75

Bettis Atomic Power Lab., Pittsburgh, Pa.
LARGE POWER REACTOR (LPR) PROGRAM.
Dec 63, 112p
Contract AT(11-1)-Gen-14

Unclassified report

Descriptors: (*Power reactors, Reactor fuels), (*Reactor fuels, Nuclear engineering).

WAPD-LPR-256 Div. 20
CFSTI Prices: HC$3.00 MF$0.75

Bettis Atomic Power Lab., Pittsburgh, Pa.
LARGE POWER REACTOR (LPR) PROGRAM.
Sep 64, 73p
Contract AT(11-1)-Gen-14

Unclassified report

Descriptors: (*Power reactors, Reactor fuels), (*Reactor fuels, Power reactors).

WAPD-MRP-110 Div. 20
CFSTI Prices: HC$2.50

Bettis Atomic Power Lab., Pittsburgh, Pa.
PRESSURIZED WATER REACTOR (PWR) PROJECT.
Technical progress rept. for 24 Jul-23 Oct 64.
23 Oct 64, 102p
Contract AT(11-1)-Gen-14

Unclassified report

Descriptors: (*Pressurized water reactors, Reviews).

WAPD-T-1718 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Bettis Atomic Power Lab., Pittsburgh, Pa.
USE OF SUPERPOSITION PRINCIPLE IN MONTE CARLO RESONANCE ESCAPE CALCULATIONS,
by E. M. Gelbard and J. Spanier. Oct 64, 10p
CONF-654-29
Contract AT-11-1-GEN-16

Unclassified report

American Nuclear Society Meeting, San Francisco, Nov-Dec 64.

Descriptors: (*Nuclear resonance, Monte Carlo method).

WAPD-T-1734 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Bettis Atomic Power Lab., Pittsburgh, Pa.
THE USE OF CORRELATED SAMPLING IN MONTE CARLO CALCULATION OF CHANGES IN THERMAL ABSORPTION,
by N. J. Curlee, Jr. and L. A. Ondis, II. Jul 64, 12p
CONF-654-30
Contract AT-11-1-GEN-14 Unclassified report

American Nuclear Society Meeting, San Francisco, Nov-Dec 64.

Descriptors: (*Neutron absorption, Monte Carlo method), (*Monte Carlo method, Neutron absorption).

WASH-1043 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Atomic Energy Commission, Washington, D. C.
Div. of Reactor Development,
PROPOSED NUCLEAR FISSION REACTOR CONCEPT CLASSIFICATION SYSTEM,
by William A. Robba and Frank Kerze, Jr.
1964, 9p
Unclassified report

Descriptors: (*Thermonuclear reactions, Nuclear reactors).

WCAP-2571 Div. 20
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
CONNECTICUT YANKEE BOTTOM-MOUNTED INSTRUMENTATION FEASIBILITY STUDY,
by H. F. Fensterer. Feb 64, 19p
Contract AT(30-1)-3250
Unclassified report

Descriptors: (*Nuclear reactors, Instrumentation).

WCAP-3269-26 Div. 20
CFSTI Prices: HC$3.00 MF$0.75

Westinghouse Electric Corp., Pittsburgh, Pa. Atomic Power Div.
LEOPARD, A SPECTRUM-DEPENDENT NON-SPATIAL DEPLETION CODE FOR THE IBM-7094,
by R. F. Barry. Sep 63, 91p
Contract AT(30-1)-3269
Unclassified report

Descriptors: (*Nuclear physics, Programming (Computers)).

21. Nuclear Propulsion

ANL-6828 Div. 21
CFSTI Prices: HC$3.00

Argonne National Lab., Ill.
PRELIMINARY PHYSICS AND HEAT TRANSFER DESIGN CALCULATIONS FOR A ROCKET FUEL TEST REACTOR (RFTR),
by D. R. MacFarlane and J. T. Madell. Aug 64, 57p
Contract W-31-109-eng-38
Unclassified report

Descriptors: (*Spacecraft nuclear propulsion, Test facilities), (*Test reactors, Heat transfer).

GEAP-3152 Div. 21
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PHYSICS METHODS CHECK AND COMPARATIVE POWER CORE ANALYSIS. N. S. SAVANNAH FUEL DEVELOPMENT PROGRAM,
by H. A. Brammer. 16 Apr 59, 17p
Contract AT(04-3)-189
Unclassified report

Descriptors: (*Reactor fuels, Nuclear engineering), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3174 Div. 21
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PRESSURE DROP THROUGH 25-ROD PARTIAL PROTOTYPE AT 520°F AND 1100 psi. N. S. SAVANNAH FUEL DEVELOPMENT PROGRAM,
by E. E. Polomik. 22 May 59, 64p
Contract AT(04-3)-189
Unclassified report

Descriptors: (*Marine nuclear propulsion, Nuclear engineering).

GEAP-3194 and Add. Div. 21
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
THERMAL SHOCK CONDITIONS AND HISTORY OF OPERATING CONDITIONS IN HEAT TRANSFER FACILITY FOR N. S. SAVANNAH 25-ROD PARTIAL PROTOTYPE FUEL ASSEMBLY. N. S. SAVANNAH FUEL DEVELOPMENT PROGRAM,
by E. E. Polomik. 18 Jun 59, 20p
Contract AT(04-3)-189
Unclassified report

Descriptors: (*Marine nuclear propulsion, Nuclear engineering).

GEAP-3224 Div. 21
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
FUEL TIME CONSTANTS AND CONTROL ELEMENT SLOT COOLANT FLOW FOR N. S. SAVANNAH REACTOR CORES I AND II,
by P. M. Blair. 11 Aug 59, 12p
Contract AT(04-3)-189
Unclassified report

Descriptors: (*Marine nuclear propulsion, Reactor control).

GEAP-3244 Div. 21
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
THERMO-HYDRAULIC STEADY-STATE ANALYSIS. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by P. M. Blair. 10 Sep 59, 37p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Marine nuclear propulsion, Nuclear reactors).

GEAP-3246(Rev.2) Div. 21
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
NUCLEAR REACTOR FUEL AND CORE DATA SHEET. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by S. G. Sawochka. 10 Oct 60, 9p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3248 Div. 21
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PRELIMINARY SUMMARY OF IRRADIATION TESTS CONDUCTED ON N. S. SAVANNAH CORE II TYPE ASSEMBLIES II-2 AND II-3 IN VBWR. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by R. K. Baird, J. O. Arterburn, F. A. Brandt, and C. N. Spalaris. 25 Sep 59, 43p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3249 Div. 21
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
INVESTIGATION OF THE MECHANICAL PROPERTIES OF THE FUEL ASSEMBLY. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by R. G. Cochran. 21 Sep 59, 31p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3250 Div. 21
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
INVESTIGATION OF THE OPERATIONAL CHARACTERISTICS OF THE FUEL ASSEMBLY. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by R. G. Cochran. 25 Sep 59, 31p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3252 Div. 21
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
REFUELING TESTS. PART I. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by Ramon E. Johnson. 23 Sep 59, 64p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3303 Div. 21
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
REACTOR PHYSICS REPORT. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by H. A. Brammer. 21 Dec 59, 53p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear physics, Nuclear reactors).

GEAP-3329(Rev.1) Div. 21
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
BURN-OUT ANALYSIS. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by C. E. Lundgren and S. G. Sawochka. 20 Sep 60
15p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3330 Div. 21
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PRESSURE LOSES AND FLOW RATES IN FUEL ASSEMBLIES. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by C. E. Lundgren. 28 Jan 60, 13p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3339 Div. 21
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.

STRESS ANALYSIS OF THE FUEL RODS USED IN THE N. S. SAVANNAH CORE II. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by F. C. Rally. 7 Mar 60, 46p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Nuclear engineering), (*Marine nuclear propulsion, Nuclear physics).

GEAP-3367 Div. 21
CFSTI Prices: HC$4.00 MF$1.00

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
SAFEGUARDS INFORMATION FOR THE N. S. SAVANNAH REACTOR FUEL MADE BY GENERAL ELECTRIC COMPANY. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by H. V. Clukey. 23 Sep 60, 136p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Nuclear engineering), (*Reactor safety systems, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor safety systems).

GEAP-3376 Div. 21
CFSTI Prices: HC$2.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PRE-IRRADIATION DATA ON N. S. SAVANNAH CORE II-4, -5, AND -6 PROTOTYPE FUEL ASSEMBLIES TO BE TESTED IN VBWR. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by R. G. Cochran. 26 Apr 60, 24p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3376(Add.) Div. 21
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
PRE-IRRADIATION DATA ON N. S. SAVANNAH CORE II-4, -5, AND -6 PROTOTYPE FUEL ASSEMBLIES TO BE TESTED IN VBWR. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by E. Mangrum, Jr. and F. H. Megerth. 1 Sep 60, 20p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3381(Rev.1) Div. 21
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
FUEL ELEMENT INTERNAL PRESSURE CONSIDERATIONS, SAVANNAH CORE II. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM.
Revised ed.,
by C. N. Spalaris and E. Mangrum, Jr. 12 Sep 60, 56p
Contract AT(04-3)-189

Unclassified report

Revision of rept. dated 20 Jun 60.

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3445 Div. 21
CFSTI Prices: HC$1.00 MF$0.50

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
N. S. SAVANNAH PROTOTYPE FUEL ASSEMBLY TENSILE AND COMPRESSIVE LOADING TESTS. N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM,
by R. G. Cochran. 9 May 60, 8p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3446 Div. 21
CFSTI Prices: HC$3.00 MF$0.75

General Electric Co., San Jose, Calif. Atomic Power Equipment Dept.
N. S. SAVANNAH FUEL DESIGN AND DEVELOPMENT PROGRAM. REFUELING TESTS. PART II,
by C. M. Shields. 23 Mar 60, 54p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

GEAP-3559 Div. 21
CFSTI Prices: HC$3.00 MF$0.75

Vallecitos Atomic Lab., General Electric Co., Pleasanton, Calif.
IRRADIATION RESULTS, N. S. SAVANNAH CORE II PROTOTYPE FUEL ASSEMBLIES. (ASSEMBLIES SAV-II-2 AND SAV-II-3),
by F. A. Brandt, J. O. Arterburn, R. K. Baird, C. N. Spalaris, and M. K. Wolverton. 7 Nov 60, 98p
Contract AT(04-3)-189

Unclassified report

Descriptors: (*Reactor fuels, Marine nuclear propulsion), (*Marine nuclear propulsion, Reactor fuels).

22. Ordnance

Patent 3,161,978 Div. 22

TORSION BAR CARTRIDGE EXTRACTOR.
Patent assigned to Army,
by John F. O'Brien and Edward A. Santos.
22 Dec 64 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Cartridge case extractors), (*Cartridge case extractors, Patents), (*Torsion bars, Cartridge case extractors), Guns, Automatic, Cartridge cases, Design.

The cartridge extractor is for use with an automatic gun which has a longitudinally reciprocating bolt. The pivotal extractor is resiliently mounted in the front end of the bolt. It is biased into engagement with the rim on a cartridge case without the necessity for utilizing a separate spring member.

Patent 3,162,119 Div. 22

DEPTH CHARGE FIRING CONTROL SYSTEM.
Patent assigned to Navy,
by Joseph B. Tate, Jr. and Louis W. Erath.
22 Dec 64 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Depth charge components), (*Depth charge components, Patents), (*Fire control systems, Depth charges), Circuits, Antisubmarine warfare.

The depth charge is fired when the scalar value of the ambient changes by a predetermined amount first in one direction as the depth charge moves within the vicinity of a submarine and thereafter changes by the same amount in the opposite direction. Firing of the depth charge in response to such changes in the value of the field is accomplished by means of a control circuit including a pair of electronic control channels, one of which is rendered responsive to an increase in the scalar value of the ambient field and is actuated when the scalar value has increased by the predetermined amount.

Patent 3,162,120 Div. 22

DOUBLE-ACTING SAFETY INITIATOR.
Patent assigned to Navy,
by Robert J. Lyon. 22 Dec 64 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Explosives initiators), (*Explosives initiators, Patents), Safety, Fuze functioning elements, Mine fuzes, Firing circuits, Timing circuits, Counting methods, Ordnance.

The double-acting safety initiator is used with a mine. It includes an extensible wire connected in a circuit for heating the wire. The circuit includes two switches. Other elements in the system include a spring-biased gear, a pair of cylindrical drums, each having a slot, and a spring-urged slide.

Patent 3,162,127 Div. 22, 12

DELAY TRAIN FOR FUZE.
Patent assigned to Navy,
by Bertram A. Breslow and Richard K. Blanche, Sr.
22 Dec 64 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Explosive trains), (*Explosive trains, Patents), (*Delay elements (Explosive), Explosive trains), Time-delay fuzes, Guided missile components, Fuze functioning elements, Explosives initiators, Igniters, Primers.

A delay train of short functioning time is provided. It permits a missile to penetrate a target, such as an airplane, before the main explosive charge carried by the missile is detonated. A delay train is provided incorporating a wall separating brisance of a primary primer from a secondary primer incorporated in a delay element.

Patent 3,162,170 Div. 22

DEVICE FOR LOADING A TORPEDO TUBE.
Patent assigned to Navy,
by John T. Gondek. 22 Dec 64 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Loaders), (*Loaders, Patents), Torpedoes, Positioning devices (Machinery), Feed mechanisms, Ordnance, Mechanical drawings.

The loading device is for moving a torpedo into a torpedo tube. The device includes a frame adapted to be connected to the torpedo, a motor carried by the frame, a sprocket carried at each end of the frame, means for rotating the sprockets from the motor and a pair of members extending along each side of the torpedo and secured in stationary relation to the torpedo tube, the members being respectively engaged by the sprockets and the frame being moved along the members by the sprockets.

UCRL-Trans-1106(L) Div. 22
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California,
Livermore.
EFFECT OF SHORT-DELAY BLASTING ON THE EXTENT OF THE SEISMIC EFFECT OF LARGE-SCALE EXPLOSIONS,
by B. V. Pozdnyakov, Yu. V. Nelyubov, A. K. Serdyukov, Yu. P. Zhuiko, and M. G. Sedlov. 1964, 10p
Unclassified report

Trans. of Gornyi Zhurnal (USSR) 1963, no. 8, p. 25-8.

Descriptors: (*Nuclear explosions, Explosion effects), (*Explosion effects, Seismic waves).

23. Personnel and Training

No Entries

24. Photography and Other Reproduction Processes

Patent 3,165,041 Div. 24

CODED SHUTTER SEQUENCE.
Patent assigned to Army,
by Charles W. Lyle. 12 Jan 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Camera shutters), (*Camera shutters, Patents), Photographic images, Rotation, Automatic.

Images are grouped in this camera in a sequence on a photographic film into patterns based on time so as to provide a definite and easily recognizable relation between a particular image and the time during which the image was formed. This is accomplished by a conventional camera having rotating shutters which are connected through a gear train to a synchronous motor, the shutters rotating at one revolution per second. There is a differential in the gear train which can, when operated, be used to slow down or speed up the shutter. A cam device automatically operates the differential and is driven by the synchronous motor.

Patent 3,165,047 Div. 24

PHOTOGRAPHIC PROCESSING APPARATUS.
Patent assigned to Army,
by Seymour L. Hersh. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Photographic processing equipment), (*Photographic processing equipment, Patents), Design, Photographic processors.

A continuously operating apparatus is provided wherein exposed sheets of printing material are processed by automatically applying individual solutions for each step in the process to the emulsion side of the sheet only in a thin film while the sheets pass through the apparatus, and removing the processing liquid from the applicator when no sheet is present. The solutions are applied to the sheets through lateral slots in solution-applying units while the sheets move thereover.

Patent 3,165,752 Div. 24

MOTION PICTURE CAMERA USING FOCAL PLANE SHUTTERS.
Patent assigned to Navy,
by Sigmund J. Jacobs. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Motion picture cameras), (*Motion picture cameras, Patents), (*Camera shutters, Motion picture cameras), High-speed cameras, Mirrors.

The camera is used to form a plurality of equal time spaced images in which the space and time coordinate of any point in all frames may be defined with high precision. The camera employs an arc containing a plurality of concave mirrors and may employ multiple slit recordings through 6 slits. The camera is for forming a series of photographs on a film of an object moving at high speed.

25. Physics

AD-441 407 Div. 25, 30
CFSTI Prices: HC$4.00

American Optical Co., Southbridge, Mass.

DEVELOPMENT OF GLASS FIBER LASERS.
Final rept. for Jul 62-Nov 63,
by Charles J. Koester. May 64, 137p
Contract AF30 602 2829, Proj. 5581, Task 558101
RADC TDR64 79
Unclassified report

See also AD-299 007.

Descriptors (*Lasers, Fiber optics), (*Fiber optics, Lasers), (*Data processing systems, Lasers), Glass, Computer logic, Optical properties, Light pulses, Light transmissions, Neuristors, Pulse generators, Amplifiers, Oscillators, Europium, Impurities, Feedback, Glass textiles.

This report details the concept and experimentation concerned with the study of glass fiber lasers as possible elements for use in optical digital data processing. Evidence is presented of amplification as large as 50,000 of low level signals by a one meter fiber laser. Saturated amplification, as a result of a high input signal, in a fiber laser is demonstrated and studies of parameters affecting refractory behavior are discussed. Properties of one, five and ten meter long fiber lasers are set down. Methods derived for prevention of oscillation in fiber lasers are described. Optical coupling between two fiber lasers in a common cladding is demonstrated and related to interconnection of fiber laser elements. Laser quenching experiments are presented and analysis is made of the laser quenching effect. Europium doped glass is discussed as an excited state absorber at 1.06 microns, possible neuristor materials are catalogued and a Q-switched laser for generating multiple pulses is described. (Author)

ANL-Trans-148 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Argonne National Lab., Ill.
APPLICATION OF PERMEABLE POROUS CERAMICS FOR THE EXPERIMENTAL STUDY OF MASS TRANSFER PHENOMENA,
by B. I. Fedorov and Z. P. Shul'man. 1964, 6p
Unclassified report

Trans. of Inzhenerno-Fizicheskii Zhurnal (USSR)
1961, v. 4, no. 2, p. 99-102.

Descriptors: (*Ceramic materials, Heat transfer).

BNL-8745 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
SUPERCONDUCTING MAGNETS, APPLICATIONS TO THE MOSSBAUER EFFECT,
by Paul P. Craig. 1964, 14p CONF-650101-1
Contract AT-30-2-GEN-16
Unclassified report

Mossbauer Symposium, New York.

Descriptors: (*Magnets, Superconductivity), (*Mossbauer effect, Instrumentation).

HW-SA-3779 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
COMPUTER PROGRAM FOR ELECTRON DIFFRACTION INTENSITIES,
by K. R. Merckx. 25 Nov 64, 23p
Contract AT(45-1)-1350 Unclassified report

Descriptors: (*Electron diffraction analysis, Intensity).

IS-967 Div. 25
CFSTI Prices: HC$3.00

Ames Lab., Iowa State Univ. of Science and Tech.
MICROWAVE MOBILITIES OF HOLES IN P-TYPE GERMANIUM,
by Bou-Loong Ho and G. C. Danielson. Aug 64, 49p
Contract W-7405-eng-82
Unclassified report

Descriptors: (*Microwaves, Semiconductors), (*Germanium, Microwaves).

LA-DC-6516(Rev.) Div. 25, 20
CFSTI Prices: HC$2.00 MF$0.50

Los Alamos Scientific Lab., Univ. of California, N. Mex.
NUCLEAR MAGNETIC SHIELDING OF A HYDROGEN ATOM IN THE FIELD OF AN ELECTRIC DIPOLE,
by Edwin M. Roberts. 1964, 28p CONF-641111-1
Contract W-7405-eng-36
Unclassified report

US-Japan Information Exchange Meeting on Ceramic Nuclear Fuels (19th) High Temperature Fuels Committee Meeting, Canoga Park, Calif.

Descriptors: (*Hydrogen, Dipole moments).

MATT-296 Div. 25, 20
CFSTI Prices: HC$1.00 MF$0.50

Princeton Univ., N. J. Plasma Physics Lab.
PARTICLE CONFINEMENT TIMES IN THE ROTATING PLASMA OF THE B-3 STELLARATOR,
by J. G. Gorman. Aug 64, 17p CONF-641108-1
Contract AT(30-1)-1238
Unclassified report

American Physical Society, New York.

Descriptors: (*Plasma physics, Thermonuclear reactions).

NYO-1480-8 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Courant Inst. of Mathematical Sciences, New York Univ., N. Y.
ACCURACY AND LIMITS OF APPLICABILITY OF SOLUTIONS OF EQUATIONS OF TRANSPORT; DILUTE MONATOMIC GASES,
by Harold Grad. 30 Sep 64, 25p MF-42, CONF-640102-1
Contract AT(30-1)-1480
Unclassified report

International Seminar on the Transport Properties of Gases Meeting, Providence.

Descriptors: (*Gases, Transport properties).

NYO-2471-5 Div. 25, 4
CFSTI Prices: HC$4.00 MF$0.75

Cornell Univ., Ithaca, N. Y. Materials Science Center.
LUMINESCENCE AND PHOTOCONDUCTIVITY IN SILVER HALIDES.
Thesis,
by George Calvin Smith. Feb 65, 120p
Contract AT(30-1)-2471 Unclassified report

Descriptors: (*Silver compounds, Halides), (*Photoelectric effect, Silver compounds), (*Luminescence, Silver compounds).

ORNL-3727 Div. 25
CFSTI Prices: HC$1.00

Oak Ridge National Lab., Tenn.
ELASTIC AND INELASTIC SCATTERING OF 8- TO 15-Mev DEUTERONS FROM (114)Cd: TABULATED DIFFERENTIAL CROSS SECTIONS,
by J. K. Dickens and F. G. Perey. Jan 65, 16p
Contract W-7405-eng-26
Unclassified report

Descriptors: (*Deuterons, Scattering).

ORNL-P-784 Div. 25, 4
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
PREPARATION OF ULTRA PURE CALCIUM CARBONATE FROM ELECTROMAGNETICALLY PRODUCED (48)Ca FOR CALCIUM FLUORIDE OPTICAL CRYSTAL GROWTH,
by J. O. Younghanse, R. L. Bailey, and H. R. Gwinn.
1964, 6p CONF-641110-1
Contract W-7405-eng-26
Unclassified report

Tennessee Academy of Science Meeting, Memphis.

Descriptors: Crystal growth, Calcium compounds), (*Calcium compounds, Carbonates).

ORNL-P-818 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Oak Ridge National Lab., Tenn.
RELEASE OF GASES FROM SURFACES BY ENERGETIC ELECTRONS,
by Robert E. Clausing. 1964, 20p CONF-640903-2
Contract W-7405-eng-26
Unclassified report

American Vacuum Society Symposium, Chicago.

Descriptors: (*Gases, Surfaces).

Patent 3,162,603 Div. 25

METHOD OF GROWING IRIDIUM SUBSTITUTED SINGLE CRYSTAL USING BISMUTH OXIDE FLUX. Patent assigned to Army,
by Jack A. Kohn, Robert O. Savage, Jr., and Arthur Tuaber. 22 Dec 64
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Single crystals), (*Single crystals, Patents), (*Ferromagnetic materials, Single crystals), Crystal growth, Magnetic properties, Iridium compounds, Bismuth compounds, Oxides, Iron compounds, Barium compounds, Cobalt compounds, Nickel compounds, Magnesium compounds, Heat treatment, Solvent extraction, Microwave equipment.

The crystals are used in microwave and millimeter device applications, as in isolators, rotators, filters, power limiters and harmonic generators. The single

crystals are magnetic oxides of barium, iron, and iridium, and a divalent metal such as cobalt, nickel, magnesium and iron. The method involves heating between 1200 and 1300 degrees C., slow cooling and removal of the crystals from the crucible by leaching.

PB-166 498 Div. 25, 8
CFSTI Prices: HC$3.00 MF$0.75

Microwave Lab., Stanford Univ., Calif.
NONLINEAR INTERACTIONS BETWEEN RADIATION AND SYSTEMS WITH QUANTIZED ENERGY LEVELS.
Final rept. for 15 Mar 62-15 Mar 64,
by R. H. Pantell. Jul 64, 58p ML-1194
Grant NSF G22929

Unclassified report

See also AD-606 219.

Descriptors: (*Semiconductors, Optical properties), (*Light, Demodulation), (*Crystal mixers, Photoconductivity), Semiconductor devices, Lasers, Microwave frequency, Cadmium alloys, Selenium alloys, Electric currents, Demodulators, Electric fields.

The nonlinear optical effects in semiconductors are investigated. The problem of generating microwave to infrared signals by modulating the bandgap of a semiconductor with a strong optical field has been considered. A description is given of the experiments performed using the photoconductive effect in bulk semiconductors to produce a microwave beat frequency from two axial mode laser frequencies.

PB-166 505 Div. 25, 20
CFSTI Prices: HC$4.00 MF$1.00

Microwave Device and Physical Electronics Lab., Univ. of Utah, Salt Lake City.
EFFECTS OF GAMMA-IRRADIATION ON THE CHARACTERISTICS OF A RUBY LASER,
by Vern R. Johnson and Richard W. Grow. Sep 64, 146p MDL NSF-7
Grants NSF G15017, NSF GP843

Unclassified report

Descriptors: (*Lasers, Gamma-ray absorption coefficients), (*Ruby, Lasers), (*Gamma-ray absorption coefficients, Lasers), (*Radiation damage, Lasers), Luminescence, Single crystals, Optical equipment components, Cobalt, Gamma rays, Absorption, Pumping (Electronics), Chromium, Ions, Optics, Quantum mechanics.

An increase in the absorption cross section responsible for optical pumping of a ruby laser is experienced as a result of gamma-irradiation. Thermoluminescence data are presented showing that electron traps, metastable states with a high potential barrier, are formed in ruby as a result of gamma-irradiation. It is also found that the threshold energy for laser action increases in relation to the amount of gamma-irradiation. Using the experimental data of this report as a basis, a model has been devised to explain mathematically what happens to the Cr(+++) ions after gamma-irradiation and how this affects laser action. Theoretical curves are presented indicating how the energy output vs. energy input to the laser varies as the amount of gamma-irradiation varies. These plots show a definite increase in threshold energy, and at higher pump energies they show the possibility of higher efficiencies after gamma-irradiation than were possible before irradiation. These theoretical results are also supported by experimental data.

PB-166 777 Div. 25, 12, 17
CFSTI Prices: HC$1.00 MF$0.50

Naval Radiological Defense Lab., San Francisco, Calif.
SOLAR ABSORPTANCE AND EMITTANCE OF REAL SURFACES AT HIGH TEMPERATURES. PART I. POLISHED METALS,
by C. P. Butler. 2 Dec 60, 24p USNRDL-TR-483
AD 250 948

Unclassified report

Descriptors: (*Thermoelectricity, Solar radiation), (*Absorption, Metals), (*Thermal radiation, Metals), Surfaces, Polishes, High temperature research, Heat transfer, Silver, Gold, Iron, Nickel, Tantalum, Molybdenum, Power supplies, Spacecraft.

A carbon arc image furnace whose radiation simulates the sun is used to heat a specimen enclosed in a black walled evacuated chamber. Solar absorptance and total hemispherical emittance values have been obtained for six polished metals from 200C to 800C. Optical instability due to thermal etching has been demonstrated at the high temperatures. Thermal conversion efficiencies have been calculated for each metal as a function of temperature. Commercially pure specimens of silver, gold, iron, nickel, tantalum and molybdenum have been measured. (Author)

SCL-DR-64-113 Div. 25, 13
CFSTI Prices: HC$2.00 MF$0.50

Sandia Corp., Livermore, Calif.
DYNAMIC LOADING OF A CYLINDRICAL SHELL,
by C. W. Robinson. Jan 65, 26p
Contract AT(29-1)-789

Unclassified report

Descriptors: (*Cylindrical bodies, Loading (Mechanics), (*Structural shells, Loading (Mechanics).

SCL-DR-64-144 Div. 25
CFSTI Prices: HC$2.00 MF$0.50

Sandia Corp., Livermore, Calif.
LOADS ON A CONICAL BODY IMPACTING SAND AND POLYURETHANE FOAM,
by W. E. Edelman and L. H. Bakken. Jan 65, 41p
Contract AT(29-1)-789

Unclassified report

Descriptors: (*Conical bodies, Impact shock).

SC-RR-64-1796 Div. 25
CFSTI Prices: HC$3.00

Sandia Lab., Albuquerque, N. Mex.
PRESSURE DISTRIBUTIONS ON SPHERE CONES,
by D. M. Ellett. Jan 65, 52p
Contract AT(29-1)789

Unclassified report

Descriptors: (*Geometrical forms, Pressure).

SRIA-135 Div. 25, 17
CFSTI Prices: HC$1.00 MF$0.50

Stanford Research Inst., Menlo Park, Calif.
SORPTION OF GASES ON METAL SURFACES IN ULTRA-HIGH VACUUM.

Quarterly progress rept. no. 9, 15 Aug-15 Nov 64,
by B. Bergsnov-Hansen, N. Endow, and R. A. Pasternak.
14 Dec 64, 20p
Contract AT(04-3)-425

Unclassified report

Descriptors: (*Gases, Sorption).

TID-21438 Div. 25, 20
CFSTI Prices: HC$1.00 MF$0.50

Maryland Univ., College Park.
A NEW MEASUREMENT OF THE KNEUTRAL-K MINUS MASS DIFFERENCE,
by R. A. Burnstein and H. A. Rubin. Jan 65,
9p Technical rept. 430
Contract AT(40-1)2504

Unclassified report

Descriptors: (*Elementary particles, Nuclear physics), (*K mesons, Measurement).

UCRL-7874(A)-T Div. 25, 20
CFSTI Prices: HC$4.00 MF$0.75

Lawrence Radiation Lab., Univ. of California, Livermore.
TOPICS IN SCATTERING THEORY. II. NON-RELATIVISTIC THEORY OF REGGE POLES,
by Malcolm H. MacGregor. May 64, 103p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Elementary particles, Scattering), (*Scattering, Theory).

UCRL-7874-T Div. 25, 20
CFSTI Prices: HC$5.00 MF$1.00

Lawrence Radiation Lab., Univ. of California, Livermore.
TOPICS IN SCATTERING THEORY. I. FORMAL THEORY OF SCATTERING,
by Malcolm H. MacGregor. May 64, 184p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Elementary particles, Scattering), (*Scattering, Theory).

UCRL-7907 (Rev.I) Div. 25, 20
CFSTI Prices: HC$1.00

Lawrence Radiation Lab., Univ. of California, Livermore.
CORRESPONDING STATES AT SMALL INTERATOMIC DISTANCES,
by R. Norris Keeler, Berni J. Alder, and Mathias van Thiel. Nov 64, 7p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Molecular structure, Atomic energy levels).

UCRL-11650 Div. 25, 20
CFSTI Prices: HC$2.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Berkeley.
FORTRAN PROGRAM KINE, CALCULATING KINEMATICAL AND DYNAMICAL QUANTITIES FOR PARTICLE INTERACTIONS AND DECAYS,
by W. Peter Trower. 3 Sep 64, 22p
Contract W-7405-eng-48

Unclassified report

Descriptors: (*Particles, Programming (Computers)).

UCRL-Trans-1133(L) Div. 25
CFSTI Prices: HC$3.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
STABILIZATION AND CONFINEMENT OF PLASMA BY HIGH-FREQUENCY ELECTROMAGNETIC FIELDS. A REVIEW OF EXPERIMENTAL STUDIES,
by S. M. Osovets. 1964, 52p

Unclassified report

Trans. of unidentified article pub. by Gosudarstvennyi Komitet po Ispol'zovaniyu Atomnoi Energii.

Descriptors: (*Plasma medium, Electromagnetic waves).

UCRL-Trans-1162(L) Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
ELECTRIC CONDUCTIVITY OF PLASMA WITH ELECTROSTATIC INSTABILITIES,
by E. A. Sukhomlin, V. A. Suprunenko, and N. I. Reva. 12p

Unclassified report

Trans. of unidentified article pub. by Khar'Kovskii Fiziko-Tekhnicheskii Institut, Karkov.

Descriptors: (*Plasma medium, Electrical conductance).

UCRL-Trans-1163(L) Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
TRANSMISSION OF PLASMA ACROSS MAGNETIC BARRIER IN THE PRESENCE OF HIGH-FREQUENCY FIELDS,
by I. I. Bakaev, Yu. G. Zadesskii, N. I. Nazarov, V. T. Tolok, and A. M. Ukrainskii. 1963, 6p

Unclassified report

Trans. of unidentified article pub. by Khar'kovskii Fiziko-Tekhnicheskii Institut, Karkov.

Descriptors: (*Plasma medium, Magnetic fields).

UCRL-Trans-1170(L) Div. 25, 20
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
PLASMA WAVE GUIDES AND INTERACTIONS OF CHARGED PARTICLE BEAMS WITH BOUNDED PLASMAS,
by M. F. Gorbatenko. 1964, 20p

Unclassified report

Trans. of unidentified article pub. by Khar'kovskii Fiziko-Tekhnicheskii Institut, Karkov.

Descriptors: (*Plasma medium, Waveguides), (*Waveguides, Plasma physics), (*Particle beams, Plasma physics).

WAPD-Trans-15 Div. 25
CFSTI Prices: HC$1.00 MF$0.50

Westinghouse Electric Corp., West Mifflin, Pa.
RESULTS OF AN INVESTIGATION OF THE SPEED OF SOUND IN MOVING GAS-LIQUID MIXTURES,
by N. I. Semenov and S. I. Kosterin. 1964, 13p
Unclassified report

Trans. of Teploenergetika (USSR) 1964, v. 11, no. 6, p. 46-51.

Descriptors: (*Sound, Velocity).

26. Production and Management

Patent 3,162,470 Div. 26

QUICK DISCONNECT HIGH PRESSURE COUPLING.
Patent assigned to Army,
by Charlie H. Davidson and Franklin Owens. 22 Dec 64
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Couplings), (*Couplings, Patents), (*Watertight fittings, Couplings), Seals (Stoppers), High pressure research.

The coupling is used in a high pressure line. The structure is designed so that two different movements are required to disconnect the members, first pulling then turning. An O-ring provides a pressure-tight seal.2

Patent 3,164,320 Div. 26, 1, 12

VACUUM PUMPING SYSTEM.
APatent assigned to Air Force,
by John T. Welbourn. 5 Jan 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Vacuum pumps), (*Vacuum pumps, Patents), Design, Arc-jet engines, Gas pumps, Chemical reactions, Gases, Temperature.

The system is useful for removing and pumping extremely hot gases, such as those evolved from an arc-jet under test operating conditions. Large volumes of a gaseous material are pumped by the chemical reaction of a gaseous element, which is to be pumped, with one or more elements of a gaseous, liquid or solid chemical compound in order to produce a third vaporous chemical compound, the vapors of which can be frozen into a solid at a much higher temperature than the original gas and at a vapor pressure low enough to satisfy the requirements of the system application.

PB-166 497 Div. 26, 30, 32
CFSTI Prices: HC$3.00 MF$0.75

Institute for Mathematical Studies in the Social Sciences, Stanford Univ., Calif.
FEASIBILITY STUDY OF AN INFORMATION SYSTEM MODEL FOR EXPERIMENTAL SIMULATION.
Technical rept. no. 8,
by Harvey M. Wagner. 30 Jul 64, 68p
Grants NSF GS552, G24064
Unclassified report

Descriptors: (*Economics, Management engineering), (*Management engineering, Effectiveness), Feasibility studies, Decision making, Management planning, Inventory control, Dynamic programming, Programming (Computers), Simulation, Programming languages, Operations research, Optimization, Labor, Costs, Statistical analysis, Production, Data.

The paper represents the outcome of a feasibility study aimed at designing a computer simulation to investigate the relationship between a business organization's economic performance and the system it uses for collecting, evaluating, and acting on the information, both internal and external, available to it. Several questions of interest include: (1) What kind of information is important to a company, and under what circumstances and with what frequency should it be sampled. (2) How may aggregates and statistical indices be best used in making decisions relating to individual components of a system. (3) How effective are some of the well-known management science optimizing techniques in different situations and under various sets of assumptions. (4) What are the economic implications of making certain decisions sequentially or in a decoupled fashion. (Author)

PB-166 748 Div. 26
CFSTI Prices: HC$1.00 MF$0.50

Bureau of Naval Weapons, Navy Dept., Washington, D. C.
HYDRAULIC CALIBRATION CONSOLE, KING NUTRONICS CORPORATION, MODEL 3348.
Instrument Calibration Procedure Technical Manual.
1 Nov 64, 18p NAVWEPS 17-20MP-11
Unclassified report

Descriptors: (*Instruction manuals, Calibration), (*Calibration, Test sets), (*Test sets, Hydraulic systems), Test methods, Pressure gages, Transducers, Meters, Hydraulic pressure pumps, Test equipment.

This manual describes the calibration of the King Nutronics Corporation Model 3348 hydraulic calibration console. The unit is of modular construction, containing three gage modules and a hand-operated hydraulic pump, all of which are installed on a single desk-top cabinet. The combination gives a fully integrated, self-contained unit designed for calibrating pressure gages, transducers, and other pressure measuring equipment within the range of 0 to 30k psi.

SC-DC-64-2041 Div. 26
CFSTI Prices: HC$2.00 MF$0.50

Sandia Corp., Albuquerque, N. Mex.
THE ROLE OF RELIABILITY IN DESIGN ACTIVITIES,
by A. C. Littleford. 1964, 27p CONF-641204-1
Contract AT(29-1)-789
Unclassified report

Reliability Program Management Seminar, Rock Island, Ill.

Descriptors: (*Reliability, Management engineering).

SC-TM-64-669 Div. 26
CFSTI Prices: HC$1.00 MF$0.50

Sandia Lab., Albuquerque, N. Mex.

PHANTOM GAGE DIMENSIONING.
Combined Part/Gage Specifications,
by E. S. Roth. Jul 64, 17p
Contract AT(29-1)-789
Unclassified report

Descriptors: (*Meters, Specifications), (*Engineering, Meters).

TID-21557 Div. 26
CFSTI Prices: HC$1.00 MF$0.50

Franklin Inst., Philadelphia, Pa. Labs. for Research and Development.
AN ANALYSIS OF THE TRAILING-EDGE EFFECT IN SLIDER AND PARTIAL-ARC GAS-LUBRICATED BEARINGS.
Interim rept.,
by H. G. Elrod, Jr. and J. T. McCabe. Dec 64, 17p
Contracts AT(30-1)-1484, Nonr234200
Unclassified report

Descriptors: (*Gas bearings, Fluid mechanics).

27. Propulsion Systems

Patent 3,164,369 Div. 27

MULTISTAGE MULTIPLE-REENTRY TURBINE.
Patent assigned to NASA,
by Warner L. Stewart and David G. Evans. 5 Jan 65
Unclassified patent
Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Axial-flow turbines), (*Axial-flow turbines, Patents), Fluid flow, Design.

The turbine has a single rotor with blades on it. The fluid propellant is supplied to these blades. A plurality of reentry ducts are provided adjacent the blades for conveying the fluid between the successive stages. The fluid propellant is staged four times through the single rotor. Reverse-flow ducting is utilized.

28. Psychology and Human Engineering

No Entries

29. Quartermaster Equipment and Supplies

Patent 3,162,535 Div. 29

PREPARATION OF DIRECTLY CONSUMABLE FOOD RATION WHEAT PRODUCTS.
Patent assigned to Agriculture,
by Robert E. Ferrel. 22 Dec 64 Unclassified patent
Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Food), (*Food, Patents), (*Wheat, Preparation).

Bulgur is essentially dry, parboiled wheat which has culinary uses similar to those of rice. The product is prepared for the table by mixing it with hot water and allowing it to stand for about 5 minutes to absorb the water.

Patent 3,162,540 Div. 29

DRYING OF YOLK-CONTAINING EGG LIQUID.
Patent assigned to Agriculture,
by Leo Kline and Takashi F. Sugihara.
22 Dec 640
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Dehydrated foods), (*Dehydrated foods, Patents), (*Eggs, Dehydrated foods), Lipids, Carbohydrates, Liquids.

Dried egg products of maximum flavor stability and other qualities are made for a yolk-containing egg liquid, containing at least 5 percent egg lipids on a solids basis. Water-soluble carbohydrate is added to a sample of the egg liquid in measured quantities to obtain the desired product. A like level is then added to the main body of the egg liquid.

Patent 3,165,414 Div. 29

PREPARATION OF RAISIN PASTE.
Patent assigned to Agriculture,
by Fredoon S. Nury. 12 Jan 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Food), (*Food, Patents), Preparation, Processing, Fruits.

The raisins are ground to form a paste. The paste is baked at from 100 to 200 degrees F. for from 1/4 hour to 10 days while it is enclosed in a container. The process reduces the tendency of the paste to set during storage.

30. Research and Research Equipment

AD-404 549 Div. 30
CFSTI Prices: HC$3.00

Lincoln Lab., Mass. Inst. of Tech., Lexington.
SKETCHPAD: A MAN-MACHINE GRAPHICAL COMMUNICATION SYSTEM.
Doctoral thesis,
by I. E. Sutherland. 30 Jan 63, 100p LL-TR-296
Contract AF19 628 500 Unclassified report
ESD TDR63 52

Descriptors: (*Pattern recognition, Display systems), (*Digital computers, Pattern recognition), Geometric forms, Pictures, Topology, Programming (Computers), Input-output devices, Graphics.

The Sketchpad system uses drawing as a novel means of communicating with a computer. The system contains input, output, and computation programs that enable it to interpret information drawn directly on a computer display. It has been used to draw electrical, mechanical, scientific, mathematical and animated drawings; it is a general-purpose system. Sketchpad has shown the most usefulness as an aid to the understanding of processes, such as the motion of linkages, which can be described with pictures. Sketchpad also makes it easy to draw highly repetitive or highly accurate drawings and to change drawings previously drawn with it.

BNL-8703 Div. 30, 4, 25
CFSTI Prices: HC$2.00 MF$0.50

Brookhaven National Lab., Upton, N. Y.
CONTINUOUS RECORDING SPECTROPHOTOMETER,
by A. Olsen, S. Goscinski, D. Miller, and J. Palmer.
16 Apr 62, 26p
Contract AT-30-2-GEN-16

Unclassified report

Descriptors: (*Spectrophotometers, Design).

CAPE-1127 Div. 30, 20

Brookhaven National Lab., Upton, N. Y.
DIGITAL DATA HANDLING SYSTEM FOR HIGH ENERGY PHYSICS.
Engineering Materials.

Unclassified drawing

Price information available from CFSTI upon request.

Descriptors: (*Digital computers, Mechanical drawings), (*Data processing systems, Mechanical drawings), (*Nuclear reactions, Data processing systems), (*Particle accelerators, Nuclear reactions), Nuclear physics, Computer storage devices, Gates (Circuits).

This data handling system was designed to store a number of bits of information that describes selected nuclear events of interest during the burst of a pulsed particle accelerator. During accelerator dead time the stored information is read out and written on a magnetic tape and simultaneously transmitted to a digital computer. The up-down address scaler is a 12-stage binary add or subtract scaler with gated trailing edge speed-up logic around the first six stages to decrease the carry (or borrow) propagation time. The scaler operates from an initially reset condition and adds one count after each word is written in memory. The last word input gating is used to write in memory two words just after a memory readout command is given and just before the memory is actually read out. The write control logic circuit controls the system when events are being written into the memory. The read control limits the data handler when information is being read out of the memory and written on tape and/or transmitted on the data link.

DP-931 Div. 30, 20
CFSTI Prices: HC$1.00

Savannah River Lab., E. I. Du Pont de Nemours and Co., Aiken, S. C.
A PERISCOPE FOR VIEWING AND PHOTOGRAPHING RADIOACTIVE OBJECTS UNDERWATER,
by Frederick C. Locke. Nov 64, 10p
Contract AT(07-2)-1

Unclassified report

Descriptors: (*Periscopes, Design).

EURAEC-1260 Div. 30
CFSTI Prices: HC$1.00 MF$0.50

Bologna Univ. (Italy). Instituto di Fisica 'A. Righi.'
GETTERING ACTION OF ZIRCONIUM INSIDE THE ELECTRON MICROSCOPE,
by Gian Franco Missiroli and Tino Visani.
1963, 6p CONF-63110 3-1

Unclassified report

Italian Symposium on Electron Microscopy (4th), Padua.

Descriptors: (*Zirconium, Electron microscopy), (*Electron microscopy, Zirconium).

HW-84448-10 Div. 30
CFSTI Prices: HC$1.00 MF$0.50

Hanford Atomic Products Operation, Richland, Wash.
ANALOG COMPUTING APPLICATIONS, OCTOBER 1964,
by R. A. Harvey. 27 Oct 64, 12p
Contract AT(45-1)-1350

Unclassified report

Descriptors: (*Analog computers, Operation).

K-1614 Div. 30
CFSTI Prices: HC$5.00

Oak Ridge Gaseous Diffusion Plant, Tenn.
THE SHARE ALGOL 60 TRANSLATOR FOR THE IBM 709/7090/7094,
ed. by Marjorie P. Lietzke. 20 Jan 65, 166p
Contract W-7405-eng-26

Unclassified repor

Descriptors: (*Programming languages, Machine translation), (*Machine translation, Programming languages).

NYO-3421-2 Div. 30
CFSTI Prices: HC$1.00 MF$0.50

RCA Labs. Div., Radio Corp. of America, Princeton, N. J.
PHOTOMULTIPLIER INVESTIGATION.
Quarterly rept. no. 2, 15 Oct-15 Dec 64,
by H. M. Smith, Jr. and R. Wasserman. 7 Jan 64, 24p
Contract AT(30-1)3421

Unclassified report

Descriptors: (*Photomultipliers, Design).

Patent 3,162,715 Div. 30

MECHANISM FOR CHANGING MAGNIFICATION OF A BINOCULAR PERISCOPE.
Patent assigned to Army,
by Wright H. Scidmore. 22 Dec 64

Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Periscopes), (*Periscopes, Patents), Optical equipment, Lenses, Theodolites, Binoculars.

The folded lens erecting system for a binocular instrument is rotatably mounted about an axis parallel

to the incident and emerging optical axes, so that the left erecting lenses may be transferred into the right optical train and the right erecting lenses may be transferred in the left optical train by rotating the system. Essentially, a translation of the lens erecting systems along their optical axes to their conjugate position occurs, effecting a change in the magnification of the system.

Patent 3,164,023 Div. 30

MOTION SENSING TRANSDUCER.
Patent assigned to Army,
by Oscar C. Holderer. 5 Jan 65 Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Transducers), (*Transducers, Patents), Design, Motion, Acceleration.

The transducer detects and records inclinations and accelerations. A sealed vessel contains a displaceable mass and a fluid having an electrical resistance different from that of the displaceable mass. The vessel has mounted therein a plurality of electrodes arranged so that a deviation in the position or movement of the device creates an unbalanced condition in an electrical circuit.

Patent 3,164,991 Div. 30

LIQUID LEVEL INDICATOR.
Patent assigned to AEC,
by Robert E. Potthoff and John F. Wilson. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents,
Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Liquid level gages), (*Liquid level gages, Patents), Boiling water reactors, Boilers, Water vapor, Phase studies, Condensers (Liquefiers), Flowmeters, Mechanical drawings.

The device is for locating the level of an interface between liquid and vapor in a boiling-water reactor or other steam generator, employed to convert the liquid to a vapor. It includes a vertical tube extending in the two-phase region. The tube has a closed end and a side orifice near the closed end. A condenser is connected with the other end of the tube and a flow meter is connected with the condenser.

PB-166 776 Div. 30, 26
CFSTI Prices: HC$2.00 MF$0.50

Army Frankford Arsenal, Philadelphia, Pa.
ULTRASONIC IN-PROCESS INSPECTION OF RESISTANCE SPOT WELDS,
by George E. Burbank and Wallace D. Taylor.
Jul 64, 33p Rept. R-1729
AD 449 005; N64 32929
Unclassified report

Descriptors: (*Spot welds, Non-destructive testing), (*Non-destructive testing, Ultrasonic radiation), (*Ultrasonic radiation, Non-destructive testing), Aluminum alloys, Spot welding, Quality control, Electrodes, Transducers, Piezoelectric crystals.

This investigation was concerned with the development and evaluation of an ultrasonic test method for examining resistance spot welds during the fabrication process. The basic approach as described in this report was tested through the examination of welds in aluminum specimens. Significant developments included (1) the transducer design which combines the piezoelectric crystals with the welding electrodes, and (2) preparation of an electronic system for photographically recording all ultrasonic signal patterns associated with the fabrication of a single weld. Repeatable ultrasonic signal patterns were obtained indicating the formation of a weld and also provided the means for predicting weld strength. Other factors concerning the operation of the welding machine were also evident. Although the initial results of this study were very encouraging, recommendations were made to extend the investigation to other types of metals to determine the validity of the typical ultrasonic pattern. (Author)

SCL-DR-64-116 Div. 30
CFSTI Prices: HC$2.00 MF$0.50

Sandia Corp., Livermore, Calif.
DIGPOD: A PROGRAM FOR COMPUTING WEIGHT, CENTER-OF-GRAVITY, AND MOMENT-OF-INERTIA USING A COORDINATE DIGITIZER,
by H. Quock. Jan 65, 38p
Contract AT(29-1)-789 Unclassified report

Descriptors: (*Computers, Programming (Computers)).

UCRL-Trans-1169(L) Div. 30, 25
CFSTI Prices: HC$1.00 MF$0.50

Lawrence Radiation Lab., Univ. of California, Livermore.
REPORTS AT THE CONFERENCE ON PHYSICS OF PLASMA AND THE PROBLEM OF CONTROLLED THERMONUCLEAR REACTIONS (3rd). IONIZATION MONOMETER WITH COLD CATHODE.
by B. A. Sharevskii and G. T. Nikolaev. 1963, 16p
Unclassified report

Descriptors: (*Ionization gages, Manometers), (*Manometers, Design).
Trans. of unidentified article pub. by Khar'kovskii Fiziko-Tekhnicheskii Institut, Karkov.

UCRL-11218(Pt.I) Div. 30, 8
CFSTI Prices: HC$2.00

Lawrence Radiation Lab., Univ. of California, Berkeley.
THE DESIGN, CONSTRUCTION, AND OPERATION OF A DIFFERENTIAL MICROMANOMETER. PART I. ELECTRONICS,
by Kenneth W. Lamers. 16 Oct 64, 31p
Contract W-7405-eng-48 Unclassified report

Descriptors: (*Manometers, Electronic equipment).

WAPD-T-1689 Div. 30
CFSTI Prices: HC$1.00 MF$0.50

Bettis Atomic Power Lab., West Mifflin, Pa.
EQUIPMENT FOR VIEWING AND PHOTOGRAPHING WITH THE REMOTE CONTROL STEREO ZOOM MICROSCOPE,
by J. H. Bowling and K. L. Rupp. Oct 64, 10p
CONF-654-28
Contract AT-11-1-GEN-14 Unclassified report

American Nuclear Society Meeting, San Francisco, Nov-Dec 64.
Descriptors: (*Remote control systems, Microscopes), (*Microscopes, Remote control systems).

31. Ships and Marine Equipment

Patent 3,165,211 Div. 31

CARGO SHIP DESIGN FOR QUICK LOADING AND DISCHARGE.
Patent assigned to Army,
by Harold A. Ablett, Geoffrey E. Childs, Paul K. Johnson, and Vernard A. Keerbs. 12 Jan 65
Unclassified patent

Available from Commissioner of Patents, Washington, D.C., 20231, $0.25

Descriptors: (*Patents, Cargo ships), (*Cargo ships, Patents), Design, Cargo, Handling.

A cargo ship construction is disclosed which is particularly for shallow-draft cargo ships. The construction includes cargo-receiving holds with accordian-hinged covers, a hingedly mounted cargo-deck extension secured to a cargo deck and to the hull, a loading ramp hingedly secured to the deck extension and a hull-stabilizing mechanism.

32. Miscellaneous Arts and Sciences

AD-425 785 Div. 32
CFSTI Prices: HC$1.00

RAND Corp., Santa Monica, Calif.
TECHNOLOGICAL ADVANCE, ECONOMIC GROWTH, AND PUBLIC POLICY,
by Richard R. Nelson. Dec 63, 20p P-2835
Unclassified report

Descriptors: (*Economics, Industrial production), (*Scientific research, Economics), Labor, Money, Production, Costs, Industries, Commerce, Public opinion, Budgets, United States.

The role of technological change with respect to the process of economic growth is discussed in order to provide a perspective on the benefits and costs involved. Some of the problems and opportunities of public policy are considered with special emphasis given to policies of research and development.

NYO-3018-7 Div. 32
CFSTI Prices: HC$3.00 MF$0.75

Pittsburgh Univ., Pa.
STUDIES ON THE PRODUCTIVITY OF VASCULAR HYDROPHYTES AND THEIR ROLE IN MINERAL CYCLING IN AQUATIC ECOSYSTEMS.
Progress rept. for 1 Jan-31 Dec 64,
by Richard T. Hartman. 15 Jan 65, 56p
Contract AT(30-1)-3018
Unclassified report

Descriptors: (*Plants (Biology), Marine biology), (*Ecology, Plants (Biology)).

PB-166 503 Div. 32, 15, 26
CFSTI Prices: HC$4.00 MF$1.00

Institute for Mathematical Studies in the Social Sciences, Stanford Univ., Calif.

A CLASS OF INVENTORY MODELS.
Technical rept. no. 7,
by Stan Fromovitz. 20 Jul 64, 123p
Grants NSF GS552, NSF24064
Unclassified report

Descriptors: (*Inventory analysis, Mathematical programming), (*Mathematical programming, Inventory analysis), Inventory, Optimization, Stochastic processes, Economics, Model theory, Nonlinear programming.

Contents
Introduction and summary
Non-linear programming with randomization
One period inventory models
Multi-period inventory models.

PB-166 756 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS-DISCOURSE ANALYSIS PROJECTS. 2. TRANSFORMATIONS MANUAL,
by Z. S. Harris. 1956, 22p
Unclassified report

Research supported by the National Science Foundation, Washington, D. C.

Descriptors: (*Language, Analysis).

Contents:
What transformations are
Transformations and quasi-transformations
Kernel
Applications
Reduction for information uses

PB-166 757 Div. 32
CFSTI Prices: HC$2.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 11. PREPARING A TEXT FOR RETRIEVAL (TENTATIVE),
by Z. S. Harris. 1958, 41p
Unclassified report

Research supported by the National Science Foundation, Washington, D. C.

Descriptors: (*Language, Analysis), (*Information retrieval, Data processing systems), Classification, Dictionaries, Data storage systems.

The paper summarizes the operations which have to be performed on a text in order to make it storeable for retrieval and for further analysis or investigation. The particular ways of operating that are proposed here were selected with a view to being reducible to machine operation.

PB-166 758 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 10. LINGUISTIC TRANSFORMATIONS FOR INFORMATION RETRIEVAL,
by Z. S. Harris. 1959, 22p
Unclassified report

Research supported by the National Science Foundation, Washington, D. C.

Descriptors: (*Language, Analysis), (*Information retrieval, Machine translation), Scientific research, Reports, Subject indexing, Computers.

The application to information retrieval of a particular relation in linguistic structure, called transformations, is discussed. The method makes possible the reduction of a text, in particular of scientific texts, to a sequence of kernel sentences, which is roughly equivalent in information to the original text. It seems possible to determine the division into kernels in such a way that each kernel will carry about as much information as is likely to be called for independently of the neighboring information in the article. A text may therefore be stored in this form (perhaps omitting, by means of formal criteria, any sections which are unnecessary for retrieval), and its individual kernels may be retrieved separately.

PB-166 759 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS-DISCOURSE ANALYSIS PROJECTS. 3c. SAMPLE ANALYSIS OF A TEXT.
Revised ed.,
by Z. S. Harris. 1957, 14p

Unclassified report

Research supported by the National Science Foundation, Washington, D. C.
Available copy will not permit fully legible reproduction.

Descriptors: (*Language, Analysis).

By means of (formal) grammatical transformations, a text is reduced to a sequence of maximally-similar subsentences. These are rearranged, to the extent necessary to bring similar subsentences together; the reordering and the coalescing of some of the similar subsentences may require knowledge of the loss specialized word meanings in the text. Since each subsentence is a structure of equivalence classes, a set of similar subsentences can be further reduced (partially with the aid of some semantic information) by just showing how the entries in each class vary in respect to each other, i.e. how they correlate. This tabulation yields not only an unredundant summary of the facts stated and arguments made, but also the possibility of inspecting these for organization, completeness, etc. (Author)

PB-166 760 Div. 32
CFSTI Prices: HC$3.00 MF$0.75

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 15. COMPUTABLE SYNTACTIC ANALYSIS,
by Z. S. Harris. 1959, 75p

Unclassified report

A revised version of this paper is available from Mouton and Co., Amsterdam, The Netherlands, as String Analysis of Sentence Structure.
See also PB-166 761.

Descriptors: (*Language, Analysis), Computers, Theory.

The main steps in a program for recognizing the structure of an English sentence are described. Each sentence is a sequence of marks, each mark a particular class (category) of words. An attempt is made to describe every sentence as composed of a center string (a particular sequence of marks found in every sentence) and various substrings X which are adjoined at stated points Y (Y is identical with 'relative center' of X) within any (center or sub-) string. (Author)

PB-166 761 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 14. A COMPUTER PROGRAM FOR SYNTACTIC ANALYSIS,
by Z. S. Harris. 1958, 23p

Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Language, Analysis), (*Programming (Computers), Language), Vocabulary, Classification, Word association, Dictionaries, Abstracting, Information retrieval, Digital computers.

The paper presents an informal presentation of a method (currently being carried out on a Univac) for determining the syntactic analysis of any English sentence, the operations being performed entirely by a digital computer operating on the sentence as it appears in print. The syntactic analysis is the first step in a series of operations designed to serve for an automatic system of information retrieval, for various investigations in language-structure theory, and for investigations toward a logistic system for science. The method calls for a dictionary which gives the syntactic classifications (but not the meanings) of each word; the article or sentence to be analyzed; and a sequence of computer programs which result in the insertion of various markers in to the sentences: these markers indicate the syntactic structure of each part of the sentence. The programs determine for each word W of the sentence what is its syntactic position within that sentence; and they do this by checking what is the sequence formed by the syntactic classification of W with the syntactic classifications of its neighboring words in the sentence. (Author)

PB-166 763 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS, DISCOURSE ANALYSIS PROJECTS. 3a. SAMPLE KERNELIZATION OF A TEXT,
by Z. S. Harris. 1957, 22p

Unclassified report

Descriptors: (*Language, Analysis), Vocabulary.

An article is reduced to kernel-sentences by means of English transformations. All the transformations are noted to the right of the kernels, at their first appearance (8, not counting the specific conjunctions and pronouns). The Comments give equivalent versions ('or') and non-equivalent alternatives, and special problems, including quasi-transformations. Each sentence is broken down into a sequence of connectors, introducers, kernels, word-sharing and pronouns being among the connectors. The center (or 'head') kernel of each sentence (or clause) is given first, the grammatically dependent kernels following it in the order of their appearance in the sentence. (Author)

PB-166 764 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 33. A DECISION METHOD FOR A CLASS OF FORMAL SYSTEMS, AND ITS APPLICATION TO TRANSFORMATIONAL ANALYSIS,
by Hans. Herzberger. 1961, 18p

Unclassified report

Descriptors: (*Language, Analysis), Classification.

The decision problem for Type-1 grammars is solved in terms of the notion of syntactic position and the relations of linking and joining. It is then suggested how this general procedure can be applied to English Transformational structure to provide a transformational recognition routine for English sentences. This routine associates with each sentence of an English text a set of kernel sentences and a record of its transformational derivation from them. In this routine a sentence is decomposed into kernel stretches and the kernel stretches are in turn associated with kernel sentences. Multiple readings are provided for structurally ambiguous sentences. (Author)

PB-166 765 Div. 32
CFSTI Prices. HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 23a. THE REPRESENTATION OF BERB INFLECTION,
by Donald J. Hillman. 1960, 14p

Unclassified report

Descriptors: (*Language, Analysis), Classification.

The aim of the paper is to set up a scheme for representing all the permissible inflected variants of a given English verb. The permissibility of any inflected variant will depend upon its ability to function as the verb in some well-formed English sentence. The procedure is to define each inflected variant as the result of a function or functions taking as arguments a verb stem and an auxiliary. Certain functions may be distinguished as primitive, in terms of which all other functions may be described.

PB-166 766 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 23b. INFLECTION FUNCTIONS IN TRANSFORMATIONAL ANALYSIS,
by Donald J. Hillman. 1960, 15p

Unclassified report

Descriptors: (*Language, Analysis), Classification, Dictionaries, Information retrieval, Word association, Selection.

The aims of the paper are: (a) to rearrange the entries in the phi-dictionary in a way more useful for machine purposes and (b) to set up classes of transformations such that each class exhausts all values of phi.

PB-166 767 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 29. THE INTUITIONS OF GRAMMATICAL CATEGORIES,
by H. Hiz. Oct 60, 16p

Unclassified report

Descriptors: (*Language, Analysis), Classification.

The theory of grammatical categories in which linguistic segments are treated as belonging to various classifications is discussed. Three intuitions which play prominent roles in such classification are considered: intersubstitutability, structural connectivity, and roles in transformations of one kind of sentence into another kind of sentence.

PB-166 768 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 21A. STEPS TOWARD GRAMMATICAL RECOGNITION,
by H. Hiz. 1959, 19p

Unclassified report

Descriptors: (*Language, Analysis), Classification, Mathematical analysis.

Contents:
Goals of a grammatical analysis
Sentence structures
Grouping
Parentheses
Algebra of grouping
Insufficiency of grouping
Regrouping
Discovery groupings
Grammatical categories
Classes of categories
Environments
Double classification
Other methods

PB-166 769 Div. 32
CFSTI Prices: HC$2.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 42. A PROCEDURE FOR A TRANSFORMATIONAL DECOMPOSITION OF ENGLISH SENTENCES,
by Aravind K. Joshi. Feb 62, 28p

Unclassified report

Descriptors: (*Language, Analysis), Classification.

A procedure for a transformational decomposition of English sentences into its kernels is described. The expected output of such a procedure is a set of kernels together with the set of respective transformations which operate on the kernels to produce the given sentence.

PB-166 770 Div. 32
CFSTI Prices: HC$3.00 MF$0.75

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 18. RECOGNITION OF LOCAL SUBSTRINGS,
by Aravind K. Joshi. 1964, 54p

Unclassified report

Descriptors: (*Language, Analysis), Machine translation, Classification.

Contents:
Representation of information inside the machine
Elementary noun-phrase
Adjuncts
Elementary verb-phrase
A sentence with all bracketing (local) operations performed on it
Flow charts
Elementary noun-phrase
Adjuncts
Elementary verb-phrase

PB-166 771 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 25. COMPUTATION OF SYNTACTIC STRUCTURE,
by Aravind K. Joshi. 1960, 17p
Unclassified report

Sponsored by National Science Foundation, Washington, D. C.
Descriptors: (*Language, Analysis), Decision making, Classification.

The paper describes a procedure for computing the syntactic structure of a sentence of a language (in particular of English). A sentence of a language is a string of words from the vocabulary of the language. The sentence can be rewritten as a sequence of class-marks where each word of the sentence is replaced by a mark corresponding to a class or classes to which the word belongs.

PB-166 772 Div. 32
CFSTI Prices: HC$3.00 MF$0.75

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 19. HIGHER-ORDER SUBSTRINGS AND WELL-FORMEDNESS,
by Bruria Kaufman. 1959, 68p
Unclassified report

Descriptors: (*Language, Analysis), Identification, Programming (Computers), Set theory.
Contents:
Sentence-map
Second-order substrings
Identification of the subject
Identification of the verb-object
Use of digits 4, 3, 2 for substrings
After the free verb-object
Internal structure of substrings
The N-counting program.

PB-166 773 Div. 32
CFSTI Prices: HC$3.00 MF$0.75

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 20. ITERATIVE COMPUTATION OF STRING NESTING (FORTRAN CODE),
by Bruria Kaufman. 1962, 62p
Unclassified report

Descriptors: (*Language, Analysis), Programming (Computers), Classification, Iterative methods, Numerical analysis, Tables, Decision making.

Two essential simplifications are presented of the program described in TDAP 19 (PB-166 772). The simplifications are purely programmatic (not linguistic), and they make the program both shorter and more transparent. The new program separates the linguistic decisions (which it presents as listings in tables), in such a way that if it is desired to change or elaborate the linguistic analysis, this can be done without disturbing the general framework of the program. In the new program, the computation of nested strings is carried out, starting from the most-nested substring and going outward to the most inclusive string (the main sentence); after we have computed a substring (i.e., determined where it ends), it is replaced by a single symbol, thus making its embedding string into the most-nested string. The same cycle of operations is repeated until all strings are exhausted. (Author)

PB-166 774 Div. 32
CFSTI Prices: HC$3.00 MF$0.75

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 12. AN EFFECTIVE PROCEDURE FOR TEXT PREPARATION.
Revised ed.,
by Ruth Z. Koensberg. 1960, 90p
Unclassified report

Descriptors: (*Language, Analysis), Information retrieval, Indexes, Dictionaries, Vocabulary, Decision making.

The paper outlines a procedure for analyzing a text into a sequence of macrokernels which preserve the informational content of the original article in a form in which it can be readily indexed and on which other informational operations can be carried out.

PB-166 775 Div. 32
CFSTI Prices: HC$2.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 36. THE TRANSFORMATIONAL STATUS OF THE DEFINITE ARTICLE IN ENGLISH,
by Beverly Robbins. Jun 61, 38p
Unclassified report

Descriptors: (*Language, Analysis), Classification.

Contents:
Chap. 1. Properties of the definite article
Chap. 2. Bound descriptions
Chap. 3. Definite descriptions modified by relative clauses
Chap. 4. Descriptions containing adjectives
Chap. 5. Descriptions of the form 'The' N sub 1 P N sub 2.

PB-166 787 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 44. ON SOME CONNECTIONS BETWEEN TRANSFORMATIONS,
by Zbigniew Lis. Jun 62, 21p
Unclassified report

Descriptors: (*Language, Analysis), Classification.

The following three topics are discussed: (1) transformations and grammatical categories, (2) dependence between transformations, and (3) range of transformations. While this paper directly concerns transformations of English, the considerations presented should be relevant to transformational analysis in general.

PB-166 788 Div. 32
CFSTI Prices: HC$2.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 38. THE TRANSFORMATIONAL STATUS OF THE DEFINITE ARTICLE IN ENGLISH.
Concluding chapter,
by Beverly Robbins. Sep 62, 43p
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Language, Analysis), Classification.

Contents:
Special and puzzling cases (Chapter 9)
Plural definite descriptions
Anaphoric 'the' N(s)
'The' A occurring substantively
as a plural form
as a stylistic variant
as dependent on a preceding N
as object of P in adverbial phrases
Adverbial 'the' with the comparative degree of A or D
Non-derived occurrences of the definite article
'The' within proper names
Indexical 'the'
Idioms
Underived adverbial P 'the' N
Hidden kernels
The generic article
Decomposition of S('the' sub g N)

PB-166 789 Div. 32
CFSTI Prices: HC$1.00 MF$0.50

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 17. ELIMINATION OF ALTERNATIVE CLASSIFICATIONS,
by Naomi Sager. 1959, 34p
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Language, Analysis), (*Classification, Decision theory), Programming (Computers), Dictionaries, Decision making.

A Univac program is presented for eliminating alternative word classifications by applying a series of tests until one test succeeds or all tests fail.

PB-166 790 Div. 32
CFSTI Prices: HC$3.00 MF$0.75

Pennsylvania Univ., Philadelphia.
TRANSFORMATIONS AND DISCOURSE ANALYSIS PROJECTS. 27. PROCEDURE FOR LEFT-TO-RIGHT RECOGNITION OF SENTENCE STRUCTURE,
by Naomi Sager. 1960, 75p
Unclassified report

Available copy will not permit fully legible reproduction.

Descriptors: (*Language, Analysis), Identification, Classification, Theory.

The program takes a particular theory of language structure (substring theory) and recognizes a sentence as an instance of that structure. This constitutes grammatical analysis of the sentence. Preliminary to the analysis, the sequence of words of a given sentence is represented by a sequence of sentence symbols indicating the grammatical class and subclass memberships of the sentence words, such as N for noun, V for verb. The sequence of sentence symbols which represent the successive words of a sentence will be called a sentence formula. A formula or any other sequence of sentence symbols (one which represents a proper part of a sentence), which contains no multiple choice of sentence symbols at any position is called definite.

PB-166 792 Div. 32, 30
CFSTI Prices: HC$3.00 MF$0.75

Texas Univ., Austin.
MACHINE LANGUAGE TRANSLATION STUDY.
Quarterly progress rept. no. 4, 1 Feb-30 Apr 60,
by W. P. Lehmann. 30 Apr 60, 56p
Contract DA36 039SC78911
AD 241 953
Unclassified report

Descriptors: (*Machine translation, Theory), (*Language, Machine translation), Input-output devices, Programming (Computers), Programming languages, Classification.

The theoretical basis for a generalized translation system is presented. The system requires complete segregation of the permanent translation process from structural characteristics of specific input and output languages. All information about specific languages is supplied to the system in data formats, called recognition and production grammars. The means by which generalized processes use grammatical data to recognize and to produce sentences is explained. A transfer process, interposed between the recognition and production processes, receives instructions from the former and instructs the latter. This is also a permanent, generalized process. Because transfer data is based on semantic categories that are common to individual languages, the scheme resembles an intermediate language approach proffered by researchers in the USSR. Methods being used to accumulate initial syntactic German and English grammars are explained. Errors in these initial grammars are to be systematically corrected during successive passes through a research cycle which incorporates the recognition process of the translation system. (Author)

PB-166 800 Div. 32, 30
CFSTI Prices: HC$3.00 MF$0.75

Texas Univ., Austin.
MACHINE LANGUAGE TRANSLATION STUDY. RESEARCH ON THE MACHINE TRANSLATION OF GERMAN.
Quarterly progress rept. no. 6, 1 Aug-31 Oct 60,
by E. D. Pendergraft, R. W. Jonas, and L. W. Tosh.
31 Oct 60, 72p
Contract DA36 039SC7891'
AD 251 071
Unclassified report

See also PB-166 191.

Descriptors: (*Machine translation, Programming (Computers)), (*Language, Machine translation), Input-output devices, Documentation, Punched cards, Coding, Computer operators, Theory.

Methods are outlined for obtaining syntactic and semantic information on two analytic levels: formational and transformational. Simplified formational descriptions are found to be useful as a starting basis for research, with later distinctions to be made systematically as suggested by first research cycle results. Difficult formational problems often may be resolved by transformational analysis. Programming for the first research cycle is reported, with documentation for the MT System control program presented in detail. The control program interprets a symbolically coded control deck of IBM cards which determines MT System program sequences, error and restart routines, console and printer displays to the computer operator, logging, tape checking and equations, intercommunication of operating conditions, and peripheral inputs and outputs. Interpretive organization allows additional control functions to be incorporated in the program as needed. (Author)

PB-166 802 Div. 32
CFSTI Prices: HC$2.00 MF$0.50

Cambridge Language Research Unit (England).

THEORY OF CLUMPS. II,
by R. M. Needham. 1961, 50p ML-139
Unclassified report

See also PB-166 804.

Descriptors: (*Subject indexing, Classification), (*Classification, Theory), Set theory, Programming (Computers), Matrix algebra, Numerical analysis, Data storage systems, Information retrieval, Word association, Great Britain.

The report forms a continuation to the paper 'The Theory of Clumps', (PB-166 804). This theory involves a method of grouping words for classification purposes in documentation.

PB-166 803 Div. 32, 30
CFSTI Prices: HC$2.00 MF$0.50

Cambridge Language Research Unit (England).
CONTRIBUTIONS TO THE THEORY OF CLUMPS: THE USEFULNESS AND FEASIBILITY OF THE THEORY. 1. THE NATURE OF THE PROBLEM OF CLASSIFICATION. 2. THE CONFORMITY OF CERTAIN CLUMP DEFINITIONS,
by A. F. Parker-Rhodes. 1961, 36p ML-138
Unclassified report

Descriptors: (*Subject indexing, Classification), (*Classification, Theory), Factor analysis, Word association, Vocabulary, Identification, Information retrieval, Feasibility studies, Word association, Great Britain.

The central problem in classification theory is to determine the existence in a given universe, of whatever empirically useful classes may objectively exist in it. The two operative expressions here are 'empirically useful' and 'objectively exist'. The paper considers only empirically useful universes, or universes in which some classes objectively exist.

PB-166 804 Div. 32
CFSTI Prices: HC$2.00 MF$0.50

Cambridge Language Research Unit (England).
THE THEORY OF CLUMPS: A NEW CONCEPT OF CLASSIFICATION AND SELECTION,
by A. F. Parker-Rhodes and R. M. Needham.
Feb 60, 30p ML-126
Unclassified report

Descriptors: (*Subject indexing, Classification), (*Classification, Theory), Algebras, Selection, Information retrieval, Set theory, Word association, Great Britain.

The purpose of the essay is to develop methods of extending the standard theory of multiple classification, based on Boolean algebra, so that it may more readily be applied to empirical data.

PB-166 806 Div. 32
CFSTI Prices: HC$3.00 MF$0.75

Diebold Group, Inc., Washington, D. C.
EXTENT AND CHARACTER OF THE UTILIZATION OF THE MONTHLY INDEX OF RUSSIAN ACCESSIONS.
Nov 62, 96p
Unclassified report

Rept. prepared for the Library of Congress, Washington, D. C.

Descriptors: (*Periodicals, Indexes), (*Indexes, USSR), (*Reports, USSR), Information retrieval, Records, Libraries, Tables, Public opinion.

The objectives of this study were (1) to determine the extent of over-all usage of the Monthly INDEX OF Russian Accession (MIRA) by category of user; (2) to determine the specific purposes for which MIRA is used, as well as of the frequency of use for each purpose; (3) to determination of the major factors that might be limiting the current and future use of MIRA; and (4) to solicit suggestions for improvements or modifications in MIRA that could substantially increase its total utility to users. Several integrated research components were undertaken to achieve the objectives. The principal research phases comprised the following: (1) approximately 60 exploratory personal interviews conducted by staff members with selected important recipient organizations; (2) a mail survey addressed to about 1,635 names comprising current recipients of MIRA and the mailing list of the American Association for the Advancement of Slavic Studies, (AAASS); and (3) a telephone and personal interview survey conducted with readily identifiable individual users of MIRA within a representative sample of organizations that are recipients of MIRA. Approximately 927 such individuals were interviewed, largely by telephone. A complete description of the research techniques and methodology used in implementing the objectives of this study is given.

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PB-166 784	06S	PB-166 784
PB-166 786	02S	PB-166 786
PB-166 787	32S	PB-166 787
PB-166 788	32S	PB-166 788
PB-166 789	32S	PB-166 789
PB-166 790	32S	PB-166 790
PB-166 792	32S	PB-166 792
PB-166 800	32S	PB-166 800
PB-166 802	32S	PB-166 802
PB-166 803	32S	PB-166 803
PB-166 804	32S	PB-166 804
PB-166 806	32S	PB-166 806
PB-166 810	16S	PB-166 810
R-375-PR	15S	AD-287 499
R-6304	05S	PB-166 743
RADC-TN 60-197	05S	PB-166 745
RAND-R-224	18S	PB-166 683
SEL-62-099	08S	AD-299 284
SMRP-RP-37	02S	PB-166 682
TID-2.4.5,SUPERSEDED	08S	PB-166 709
TRR-5.3.6	08S	PB-166 716
TRR-9.2.1	08S	PB-166 722
USNRDL-(R)TR-483	25S	PB-166 777
WT-1152	20S	PB-166 778
18516	05S	PB-166 729
29294	08S	PB-166 726
36707	08S	PB-166 711
36728	08S	PB-166 709
47187	08S	PB-166 708
49526	08S	PB-166 718
51561	05S	PB-166 719
55112	08S	PB-166 710
55232	08S	PB-166 721
55847	05S	PB-166 713
56610	08S	PB-166 720
62838	08S	PB-166 702
65409	08S	PB-166 703
67334	08S	PB-166 723
74537	08S	PB-166 704
80030	08S	PB-166 715
81680	08S	PB-166 686
92022	08S	PB-166 732
92481	08S	PB-166 714
92766	08S	PB-166 733
9363	05S	PB-166 730
99287	08S	PB-166 716

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ORDER NO.	DIV	HC-PRICES-MF		ORDER NO.	DIV	HC-PRICES-MF		ORDER NO.	DIV	HC-PRICES-MF	
AD-287 499	15S	$6.00		PB-166 714	8S	$1.00	$0.50	PB-166 752	14S	$2.00	$0.50
AD-299 284	8S	$3.00		PB-166 715	8S	$1.00	$0.50	PB-166 754	2S	$2.00	$0.50
AD-425 785	32S	$1.00		PB-166 716	8S	$1.00	$0.50	PB-166 755	14S	$1.00	$0.50
AD-446 447	20S	$4.00		PB-166 717	8S	$1.00	$0.50	PB-166 756	32S	$1.00	$0.50
PB-166 406	10S	$5.00	$1.25	PB-166 718	8S	$2.00	$0.50	PB-166 757	32S	$2.00	$0.50
PB-166 498	25S	$3.00	$0.75	PB-166 719	5S	$2.00	$0.50	PB-166 758	32S	$1.00	$0.50
PB-166 503	32S	$4.00	$1.00	PB-166 720	8S	$1.00	$0.50	PB-166 759	32S	$1.00	$0.50
PB-166 682	2S	$2.00	$0.50	PB-166 721	8S	$1.00	$0.50	PB-166 760	32S	$3.00	$0.75
PB-166 683	18S	$4.00	$1.00	PB-166 722	8S	$1.00	$0.50	PB-166 761	32S	$1.00	$0.50
PB-166 684	8S	$1.00	$0.50	PB-166 723	8S	$1.00	$0.50	PB-166 763	32S	$1.00	$0.50
PB-166 685	8S	$1.00	$0.50	PB-166 724	8S	$2.00	$0.50	PB-166 764	32S	$1.00	$0.50
PB-166 686	8S	$1.00	$0.50	PB-166 725	8S	$4.00	$0.75	PB-166 765	32S	$1.00	$0.50
PB-166 687	8S	$1.00	$0.50	PB-166 726	8S	$1.00	$0.50	PB-166 766	32S	$1.00	$0.50
PB-166 688	8S	$1.00	$0.50	PB-166 727	8S	$2.00	$0.50	PB-166 767	32S	$1.00	$0.50
PB-166 689	8S	$1.00	$0.50	PB-166 728	8S	$1.00	$0.50	PB-166 768	32S	$1.00	$0.50
PB-166 690	8S	$1.00	$0.50	PB-166 729	5S	$1.00	$0.50	PB-166 769	32S	$2.00	$0.50
PB-166 691	8S	$1.00	$0.50	PB-166 730	5S	$1.00	$0.50	PB-166 770	32S	$3.00	$0.75
PB-166 692	8S	$1.00	$0.50	PB-166 731	5S	$1.00	$0.50	PB-166 771	32S	$1.00	$0.50
PB-166 693	8S	$1.00	$0.50	PB-166 732	8S	$3.00	$0.75	PB-166 772	32S	$3.00	$0.75
PB-166 694	8S	$1.00	$0.50	PB-166 733	8S	$1.00	$0.50	PB-166 773	32S	$3.00	$0.75
PB-166 695	8S	$1.00	$0.50	PB-166 734	8S	$1.00	$0.50	PB-166 774	32S	$3.00	$0.75
PB-166 696	8S	$2.00	$0.50	PB-166 735	8S	$1.00	$0.50	PB-166 775	32S	$2.00	$0.50
PB-166 697	8S	$3.00	$0.75	PB-166 736	8S	$2.00	$0.50	PB-166 776	30S	$2.00	$0.50
PB-166 698	8S	$1.00	$0.50	PB-166 737	8S	$1.00	$0.50	PB-166 777	25S	$1.00	$0.50
PB-166 699	8S	$1.00	$0.50	PB-166 738	8S	$1.00	$0.50	PB-166 778	20S	$4.00	$1.00
PB-166 700	19S	$1.00	$0.50	PB-166 739	8S	$2.00	$0.50	PB-166 782	5S	$1.00	$0.50
PB-166 701	5S	$1.00	$0.50	PB-166 740	8S	$1.00	$0.50	PB-166 784	6S	$2.00	$0.50
PB-166 702	8S	$2.00	$0.50	PB-166 741	8S	$1.00	$0.50	PB-166 786	2S	$1.00	$0.50
PB-166 703	8S	$4.00	$0.75	PB-166 742	8S	$1.00	$0.50	PB-166 787	32S	$1.00	$0.50
PB-166 704	8S	$1.00	$0.50	PB-166 743	5S	$1.00	$0.50	PB-166 788	32S	$2.00	$0.50
PB-166 705	15S	$1.00	$0.50	PB-166 744-1	10S	$8.10	$2.25	PB-166 789	32S	$1.00	$0.50
PB-166 706	8S	$1.00	$0.50	PB-166 744-2	10S	$8.75	$2.50	PB-166 790	32S	$3.00	$0.75
PB-166 707	5S	$1.00	$0.50	PB-166 745	5S	$2.00	$0.50	PB-166 792	32S	$3.00	$0.75
PB-166 708	8S	$1.00	$0.50	PB-166 746	15S	$1.00	$0.50	PB-166 800	32S	$3.00	$0.75
PB-166 709	8S	$3.00	$0.75	PB-166 747	14S	$3.00	$0.50	PB-166 802	32S	$2.00	$0.50
PB-166 710	8S	$1.00	$0.50	PB-166 748	26S	$1.00	$0.50	PB-166 803	32S	$2.00	$0.50
PB-166 711	8S	$1.00	$0.50	PB-166 749	8S	$1.00	$0.50	PB-166 804	32S	$2.00	$0.50
PB-166 712	8S	$1.00	$0.50	PB-166 750	14S	$3.00	$0.75	PB-166 806	32S	$3.00	$0.75
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